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THE PRESENT STATUS OF THE HIGH CARBOHYDRATE-LOW CALORIE DIETS FOR THE TREATMENT OF DIABETES*

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FROM our clinical and laboratory experiences with the high carbohydrate-low calorie diet in hundreds of cases for more than one year, I believe that, subject to future discoveries in the metabolism of diabetes mellitus, this diet has come to stay. It has passed the experimental stage. The favourable results are reflected in the general condition of the patients, and are particularly well supported by the laboratory findings, and the reduction of insulin dosage. It is generally recognized that the clinical condition of diabetics may, at times, be very misleading. They may look and feel very well while actually being overfed with the aid of insulin. However, the persistent hyperglycæmia found in such cases is an indication that the diabetes is not under proper control and any mishap which tends to lower carbohydrate tolerance and interfere with the action of insulin, such as an injury or infection, may very rapidly lead to coma and death. The condition produced by such treatment corresponds somewhat to that which may readily be produced in depancreatized dogs.

When depancreatized dogs, treated with insulin, are made fat by feeding them with excess of carbohydrate, they exhibit much more acute symptoms of diabetes when insulin is withdrawn than are observed under the same circumstances in the case of thin dogs. The hyperglycæmia, ketonæmia and glycosuria are all more intense, but, most striking of all, the general symptoms are extremely acute, and a fat animal seldom lives for more than four days after discontinuing the insulin, whereas the thin one may live several weeks.¹

The first and most important point which I wish to emphasize about this new diet is that our diabetics are not being over-fed. As a matter of fact, the caloric values of these diets are somewhat lower than with our previous low carbo-

hydrate-high fat diets. (Note that these diets are called high carbohydrate-low *calorie* and not high carbohydrate-low *fat*.) Our respiratory metabolism data clearly indicate the absence of over-feeding. If due consideration is given to technical and other sources of error in the determination and in the interpretation of respiratory quotients, it may be stated, generally, that the respiratory quotient obtained in the fasting state is a fairly reliable index of the degree of storage of carbohydrates in the body; the greater the respiratory quotient, the greater the storage. Judging by the available data, our average respiratory quotient, obtained in the fasting state, in persons on this new diet is 0.76. Since the normal average is about 0.82, it may be assumed that our diabetics are utilizing all, or practically all, the food given each day; little or none is left for storage. The result is that our patients are kept about five or ten pounds below the generally accepted normal values.

Apropos of height-weight relationships, may I, parenthetically, outline here a very simple method of determining proper height-weight relationships. It is based upon calculations I made from a large number of available height-weight tables of different countries. According to our experiences with it during the last ten years, it has proved to be a very satisfactory guide. It is concerned with adults only and the proper weight of an individual is obtained as follows.—

Individuals are divided into four groups, according to their ages, namely, 15-25, 26-30, 31-35, and 35 years upward. Assuming all of them to be five feet tall, the corresponding weights of the different groups for this height are 120, 125, 130

*Read at the Springfield Academy of Medicine, Springfield, Mass., Dec. 8, 1931.

and 135 pounds respectively. Allow three pounds for each inch above five feet. In the case of females subtract five pounds from the final result. Thus:—

Male, aged 33 years, height 5 feet 6 inches:—
 Normal body weight = $130 + (6 \times 3) = 148$ pounds.
 Female, aged 38 years, height 5 feet 4 inches:—
 Normal body weight = $135 + (4 \times 3) = 147$ pounds—
 5 = 142 pounds.

For purposes of brevity, I shall not discuss the diet in detail, as this has been done on previous occasions (^{2,3,4}). Consideration was then given to the effects of changes of treatment from low carbohydrate-high fat to high carbohydrate-low calorie diets upon blood and urine sugar, urinary nitrogen, plasma cholesterol, body weight, respiratory quotient, etc. There is very little to add to the average values then obtained.

Interpretation of the results of any form of treatment of diabetes mellitus depends, obviously, upon the type of diabetes concerned. For example, there is the juvenile diabetes; the acute diabetes of adults; that secondary to disease of the gall bladder and biliary passages; and diabetes associated with the various forms of cirrhosis of the pancreas; chronic progressive diabetes complicated by infection or some other condition which, *per se*, causes hyperglycemia, (thyroid pituitary, etc.); and the uncomplicated chronic progressive diabetes.

From our experiences, so far at least, it appears that the diet is applicable to all of these forms. The cases I cite as representative of the different types of the disease have been selected because of the reliability of the patients in following the prescribed treatment and the regularity with which clinical and laboratory data were obtained. No form of treatment can be successful unless it is followed as prescribed. This applies more to this new diet than to any other previously made use of. Since the diet consists of large amounts of carbohydrate, small amounts of fat, and practically normal amounts of protein, and since patients find both the carbohydrates and protein portions adequate, the remaining temptation is, therefore, to take larger amounts of fat than prescribed. With larger amounts of fat, the patient is, obviously, receiving no diabetic treatment whatever. It is under these conditions that individuals who formerly have not required insulin must now make use of it, and those who have required it with the older forms of treatment must take more. May I here repeat the warning that if the physician is not reasonably certain in a given case that the patient will

follow treatment as prescribed, he had better adhere to the older diets, moderate deviations from which are less likely to be harmful. It is our practice, as soon as we find that the patients have *deliberately* broken their diets, to return them to their older form of treatment. These older diets consist of 50, 75, 100, 125 and 150 grams of carbohydrate, depending upon the height-weight relationship of the individuals. The protein and fat contents of the diet in each case are practically the same, namely, 50 and 150 grams respectively.

It might be interesting to correlate all of our data obtained so far and deal with average values only. As stated, however, this will not be done, for there is very little to add to the observations made. Another reason is that conclusions based upon statistical data have not a universal appeal. I shall, therefore, briefly refer to results obtained in representative cases of the different types of diabetes.

JUVENILE DIABETES

CASE 1

(Hosp. No. 5997/30). This is the case of a boy six years of age who was first admitted to the Montreal General Hospital on October 17th, 1930. On admission, the urine contained large amounts of sugar and acetone bodies, and the blood sugar was 0.400 per cent. With the exception of the x-ray findings in the chest—moderate increase in the bronchial and peri-bronchial thickening—the findings at the physical examination were normal. On discharge from the hospital (Nov. 12th, 1930), the urine was free of sugar and acetone bodies and the blood sugar was normal, namely, 0.070 per cent. The body weight was $40\frac{1}{4}$ pounds, and the diet consisted of 182 grams of carbohydrate, 56 grams fat, and 63 grams protein. The insulin dosage was *twenty units* twice a day. Approximately one year later (October 6th, 1931), the urine was still free of sugar and acetone bodies, and the blood sugar was 0.164 per cent, three hours after his noon meal. He was taking *five units* of insulin twice a day. The body weight was 48 pounds.

Since his discharge from the hospital, he has returned to the clinic twenty times. On each occasion, with one exception, the urine was free of sugar and acetone bodies; the one exception was on May 19th, 1931, when the mother stated that she had some difficulty the day before with the syringe—"It leaked badly".

ACUTE DIABETES OF ADULTS

CASE 2

(Hosp. No. 6000/29). This patient was admitted on October 14th, 1929, with a history of a sudden onset of polyuria, weakness, and rapid loss of weight approximately three weeks prior to admission. The findings of the physical examination were negative, with the exception of x-ray findings in the chest—in the left infraclavicular region there was a suggestion of tuberculous infiltration. On admission, the urine contained large amounts of sugar, but no acetone bodies, and the blood sugar was 0.714 per cent. On discharge from the hospital (October 30th, 1929), the urine was free of sugar and acetone bodies, and the blood sugar was normal, namely, 0.091 per cent. The body weight was 140 pounds. The insulin dosage was *ten units* once a day. The diet then consisted of 125 grams of carbohydrate, 150 grams fat, and 50 grams protein. At the six different visits to the clinic until September 2nd, 1930, the urine was always free of sugar and acetone bodies, and the blood sugar was normal. On September 2nd, his diet was changed to 254 grams of carbohydrate, 45 grams fat, and 75 grams protein.

With two exceptions since then, on seven different occasions, the urine has been free of sugar and acetone bodies, and the blood sugar was normal. On the two exceptional days, the blood sugar was 0.178 and 0.137 per cent, respectively. The body weight is still 140 pounds. He is now receiving no insulin. In other words, in this case the diet was changed from 125 grams of carbohydrate to 254 grams without additional insulin, and without impairment in the carbohydrate metabolism. The plasma cholesterol data show a remarkable change. At the three last visits before the diet was changed in 1930 (June 28th, August 1st and September 2nd), they were 0.326, 0.387 and 0.315, respectively. Since then they have not only been normal but below normal, and, at the last visit (September 18th, 1931), that is, about one year since the diet was changed, the plasma cholesterol was 0.134 per cent.

"GALL BLADDER" DIABETES

CASE 3

(Hosp. No. 2639/30). A physician, aged 43 years, a diabetic of four years' duration, returned for a periodic examination in May, 1930. The only associated condition was chronic cholecystitis. The gall bladder was found to be definitely diseased. Two attempts to visualize it with the aid of phenoltetraiodophthalein administered intravenously failed. On discharge from the hospital, the urine was free of sugar and acetone bodies, and the blood sugar was on the border-line of the normal, namely, 0.122 per cent. The diet since November, 1929, consisted of 150 grams of carbohydrate, 140 grams fat, and 50 grams protein, and the insulin dosage was *ten units*, one-half hour before the morning and one-half hour before the evening meals. The diet was then changed to 272 grams of carbohydrate, 45 grams fat, and 78 grams protein, and on October 1st, 1931, sixteen months later, he writes "I am always sugar free and feel well, with blood sugar within the normal limits. I have gained no weight, in fact am a little lighter. Playing much golf. My insulin dosage is five units three times a day".

Here, therefore, we have a case of diabetes complicated by chronic cholecystitis in which the carbohydrate content of the diet was changed from 150 grams to 272 grams, not only with no additional insulin but with a slight reduction. It is very difficult to attribute this change to improvement of the cholecystitis, since nothing was done for it. Incidentally, the low fat content of this diet fits in with the generally accepted treatment for biliary disease. Also, if our present conception of liver function is correct, conditions which tend to lead to progressive hepatitis demand liberal carbohydrate diets in order to prevent the latter.

If we calculate the caloric content of this diet, it is obvious that this physician is receiving a much smaller amount of food than is theoretically required according to calculations based upon body weight and height. It would appear from such experiences that the Law of Conservation of Energy does not apply to the human body. This, however, would be a ridiculous assumption. Energy does not arise from nothing; wherever it is active it must have been potential elsewhere. We, therefore, have to seek another explanation. There are abundant metabolic data to support the view that if a person is exposed for any

length of time to a diet below the ordinary requirements, the metabolism is lowered—the energy expenditure becomes less. It would otherwise be difficult to explain the fact that hundreds of our diabetics have been living upon less than 2,000 calories a day for a number of years, and with such diets have been attending to their usual duties.

A striking example of the possible difference between actual and theoretical calorie requirements is found in

CASE 4

C.S. (Hosp. No. 2353/31), a young diabetic, 23 years of age, a very active athlete and now engaged in hockey. Though I do not presume to give an opinion on sports, I have the impression that there is perhaps no other game which demands greater muscular exertion than Canadian hockey. This hockey player is receiving 254 grams of carbohydrate, 45 grams fat, and 72 grams protein, and maintains his body weight between ten and twelve pounds below the normal for his height and age.

CHRONIC PROGRESSIVE DIABETES COMPLICATED BY INFECTION AND INJURY (OPERATION).

A most striking example of the possible course of events in this type of diabetes was met with recently.

CASE 5

A male (Hosp. No. 4461/31), 64 years of age, a diabetic of three years' duration, was admitted in a state of pre-coma. Drowsiness was marked; the breathing was of the deep, laboured type; the tongue was dry and beefy in appearance, and presented a sandpaper-like sensation on palpation; the eyeballs were soft, and there was a marked odour of acetone on the breath. In addition, the urine contained large amounts of sugar and acetone bodies, and many casts, and the blood sugar was 0.588 per cent. Fifty units of insulin were administered subcutaneously, followed by twenty units every four hours. The following morning, the clinical signs of the acidosis were absent. The urine still contained sugar and acetone bodies, but this could readily be explained by the "residual" urine in the bladder. The blood sugar was normal, namely, 0.122 per cent. The associated conditions were cardio-vascular-renal disease, with marked optic neuritis. There was also prostatic hypertrophy and cystitis. He gave a history of marked thirst, polyuria, and loss of weight, for three months prior to admission, approximately 40 pounds.

Following our usual treatment of coma, the food for the first forty-eight hours was restricted to water, clear, fat-free and well salted broth, tea, coffee and orange juice; the equivalent of 10 grams of sugar was given with each dose of insulin. On August 9th, he received 20 units of insulin every six hours and on August 10th, 10 units every eight hours. On August 11th, dietetic treatment was instituted. He was given the high carbohydrate—low calorie diet on the "ladder" basis, and 20 units of insulin twice a day, one-half hour before the morning and evening meals. From the beginning of the dietetic treatment until the day of discharge the urine was always free of sugar and acetone bodies, and the blood sugar was normal or nearly normal in the fasting state, except during the first few days of treatment. On September 1st, twenty days after admission, a supra-pubic cystostomy was performed under local anaesthesia and on September 11th, ten days later, the prostate was enucleated under ether anaesthesia. On September 27th, it was possible to discontinue insulin treatment. On October 7th, he was discharged from the hospital. His records in the Out-door Clinic for Diabetes since his discharge show that his urine is still free of sugar and acetone bodies on a diet of 218 grams of carbohydrate, 45 grams fat, and 69 grams protein.

To summarize, we have a male, 64 years of age, with a history of diabetes of three years' duration, his condition complicated by cardio-vascular-renal disease, prostatic enlargement, cystitis, and pyuria, admitted to the hospital in a state of pre-coma. Following the usual treatment for coma, he was given a high carbohydrate-low calorie diet, and in spite of the advanced stage of the diabetes on admission underwent a supra-pubic cystotomy and later an enucleation of the prostate. Shortly after, it was possible to entirely discontinue the use of insulin, though the carbohydrate content of the diet was over 200 grams. Incidentally, such diets conform to the generally accepted practice of giving liberal carbohydrate diets prior to surgical procedures.

There is an obvious difficulty in the interpretation of the above data. It is generally recognized that in the types of diabetes mentioned, carbohydrate tolerance tends to improve rapidly following treatment. For example, with the exception of pneumonia after the crisis, there is probably no more striking change in the metabolism of an individual than in a diabetic suffering from an infection after removal of the latter. In juvenile diabetes rapid improvement in carbohydrate tolerance is also frequently noted. It may, therefore, be possible that herein is the explanation of the above results. Our former experiences with older diets, however, do not tend to support this view. This explanation also hardly applies to the so-called chronic progressive diabetes without complications. Though occasionally one may meet with improvement in carbohydrate tolerance, particularly in elderly people with diabetes of some years' duration, our records support the view that once such diabetics require insulin, they always require it. Undoubtedly, there are a large number of persons who shortly after discharge from the hospital are able to do with little or none at all. The improved carbohydrate tolerance is apparently due to exercise. However, such improvement as has been noted with the new diet has not been met with before, except rarely.

UNCOMPLICATED CHRONIC PROGRESSIVE DIABETES

The following two cases are representative samples of the possible course of events in chronic progressive diabetes without complications. In one the diabetes was controlled without insulin, and in the other insulin was required.

CASE 6

(Hosp. No. 6236/30), a male, aged 27 years. On the day of discharge after his first admission in October, 1929, the diet consisted of 125 grams of carbohydrate, 140 grams fat and 50 grams protein. The urine was free of sugar and acetone bodies, and the blood sugar was normal. He was a very severe diabetic and required eighty units of insulin a day.

On October 28th, 1930, he was re-admitted, in order to substitute the new high carbohydrate-low calorie diet for the old one. It was then found that he could tolerate a diet of 254 grams of carbohydrate, 45 grams fat, and 75 grams protein with 40 units of insulin a day, 25 units before the morning and 15 units before the evening meal. On discharge from the hospital, on November 10th, it was found that the urine was free of sugar and acetone bodies, and the blood sugar was normal, namely, 0.108 per cent. He was a very active man and his body weight had decreased from 148½ pounds in October, 1929, to 134 pounds in April, 1931. In view of the loss of body weight, the diet was further increased to 290 grams, and two months later to 308 grams of carbohydrate.

He returned for observation in October, 1931, and on discharge from the hospital it was found that on 35 units of insulin he could tolerate a diet of 308 grams of carbohydrate, 45 grams fat, and 84 grams protein. The urine was free from sugar and acetone bodies, and the blood sugar was normal.

Here, therefore, we have a man who has been on the high carbohydrate-low calorie diet since October, 1930, whose diet has been changed from 125 grams carbohydrate to 308 grams and the insulin dosage from eighty units to thirty-five units.

CASE 7

A.A.B., a male, aged 56 years, a diabetic of three years' duration, who had been under constant observation in the clinic since his diabetes was first discovered in 1928. Though he had always been sugar-free on a diet of 125 grams of carbohydrate, 140 grams fat, and 60 grams protein, the blood sugar has never been normal, ranging between 0.130 and 0.200 per cent. The cholesterol content of the plasma was also high, ranging between 0.333 and 0.416 per cent. On April 16th, 1931, in spite of hyperglycemia (the blood sugar was 0.200 per cent) the diet was changed to 254 grams of carbohydrate, 45 grams fat, and 75 grams protein. On June 11th, 1931, the carbohydrate content of the diet was further increased to 272 grams. Since then, the urine has always been sugar free and the blood sugar normal or nearly normal. The last records show a blood sugar of 0.116 per cent and a cholesterol of 0.216 per cent.

INDICATIONS FOR THE USE OF INSULIN

Interpretation of the above data depends, obviously, upon the method used in this study for determining whether individuals did, or did not, require insulin. As is well known, there are a variety of procedures. From my own experience, I must say that, unless the plan described here is adhered to, it is quite difficult to determine in cases in which insulin dosage has been reduced whether the initial amounts were actually necessary. Clinical impressions may be very misleading, and have often explained apparent improvement of carbohydrate tolerance following institution of insulin treatment. Careful metabolic studies, however, have frequently revealed in such cases the fact that no insulin was required

at the beginning of treatment; diet alone would have sufficed. From a careful statistical analysis, with proper statistical methods, of many hundreds of cases, the writer drew the conclusion that insulin does not improve carbohydrate tolerance, except in certain types of diabetes; its removal is followed by a corresponding loss of capacity to utilize sugars.⁵ Our routine in each case is as follows:—

ROUTINE TREATMENT

On admission to the hospital, the patient is given a starvation diet (green days) for two or three days. The diet is then gradually increased on a "ladder" basis. Urinary sugar is estimated quantitatively daily, and the blood sugar every second day in the fasting state. Except in very severe diabetes, with such treatment the glycosuria disappears, and the blood sugar not infrequently returns to the normal level within the first few days of observation. With further increase of diet, however, hyperglycæmia may or may not reappear. If the hyperglycæmia is marked, whether or not accompanied by glycosuria, insulin treatment is immediately instituted. If the hyperglycæmia is moderate, the blood sugar ranging between 0.13 and 0.200 per cent, the individual is asked to assist the nurses in their ward duties so that the exercise will conform as much as possible to his ordinary activities. If, following such activity, the blood sugar decreases in spite of a further increase of diet, no insulin is given. If, however, in spite of activity, hyperglycæmia persists, insulin treatment is then instituted, whether the urine does or does not contain sugar.

We begin with about ten units of insulin once a day, one-half hour before the morning meal. If with this dosage the blood sugar remains normal, or shows slight hyperglycæmia only with increase of diet, the insulin is not increased. If an increase is required, the addition is made before the evening meal. Further additions are made by adding five units first to the morning and then to the evening meal. If two doses a day do not suffice, we partition the urine in order to determine when glycosuria occurs most frequently. Thus:—

<i>Specimen</i>	<i>Represents</i>
8 a.m. to 12 noon	Breakfast
12 noon to 5 p.m.	Lunch
5 p.m. to 10 p.m.	Evening meal
10 p.m. to 7 a.m.	Night metabolism
7 a.m. to 8 a.m.	Fasting state

With this plan it may be found that the individual requires not more insulin but a different distribution of dosage. When, therefore, by the procedure outlined in these studies, we found the insulin dosage was reduced in a given case, I believe it is a reasonable assumption that the reduction was due largely to the diet and not to other possible contributing factors.

That these diets have resulted in a fundamental alteration of metabolism of the diabetic is suggested from urinary nitrogen, plasma cholesterol and other metabolic data. Some of these were shown in a previous report.³ The altered nitrogen metabolism is probably the chief explanation of the general well-being of these patients. Whereas, as is well known, with diets of high fat content it was almost impossible to attain and maintain nitrogen equilibrium, the new diets almost invariably cause nitrogen retention in the early stages of treatment. An explanation of this phenomenon may be found in Kayser's experiments and those of Talquist, quoted by Sherman⁷, on the sparing action of fat compared with that of carbohydrate. These experiments clearly demonstrate that, on diets of equal caloric value, when fat was substituted for carbohydrate there was a marked increase of protein katabolism with corresponding loss of nitrogen from the body. With continuation of fat, there was progressive loss of nitrogen; whereas, on returning to carbohydrates, not only was the loss of protein stopped but the body began almost at once to replace the protein it had lost.

EFFECT OF DIET IN CARDIO-VASCULAR DISEASE

That these diets may have an especially favourable influence on patients with cardio-vascular disease is suggested from the following cases.

CASE 8

A.A.A. (Hosp. No. 3953/29), male, aged 59 years, was admitted to the Montreal General Hospital on June 7th, 1929, with a history of diabetes of 14 years' duration and complaints of "burning sensation and shortness of breath on walking and, at times, pain". The diagnosis was chronic myocarditis with angina pectoris. There were the usual features of cardio-vascular disease (mild hypertension, slight cardiac hypertrophy, accentuation of the aortic second sound, and thickened radial vessels. The fundi also showed thickened vessels). The electro-cardiograph showed inversion of the T-wave in both leads 1 and 2, and variations from the normal usually regarded as evidence of impaired muscle tone. The findings were, otherwise, essentially negative, except for the diabetes. There was no history, nor were there any physical, x-ray, or other laboratory signs, of biliary disease. The lungs were found normal, both by physical and x-ray examination. The x-ray showed no calcification of the arteries of the feet. The Wassermann test was negative. Briefly, the metabolic data were as follows.

When the patient was first seen there was a marked hyperglycæmia (blood sugar=0.285 per cent) and glyco-

suria, but no acetonuria. He was given the usual treatment. After three "green days", the diet was gradually increased to the maintenance level. On discharge, the urine was free of sugar and acetone bodies and the blood sugar was normal (0.111 per cent). The diet consisted approximately of 50 grams of carbohydrate, 150 grams fat, and 50 grams protein. No insulin was required to maintain this ideal state. Since discharge from the hospital he returned at regular intervals for examination. The urine was always sugar-free, but the blood sugar ranged between 0.15 and 0.17 per cent. The cholesterol was always high, ranging between 0.400 and 0.577 per cent. In spite of the fact that he was following his diet, and adhered to the usual rules as to the régime for his heart disease (avoidance of excitement, tobacco, etc.), there was no improvement in the condition of the heart; the anginal attacks became more frequent and more severe. On October 20th, 1930, he had reached the state in which he could hardly walk more than a few minutes without precipitating an attack. His blood showed a greater degree of hyperglycemia; the blood sugar was 0.200 per cent. In spite of this hyperglycemia, his diet was changed to 272 grams of carbohydrate, 56 grams fat and 78 grams protein. He was warned to watch his urine carefully and report any glycosuria. Nitroglycerine was then also prescribed. He returned for examination on April 24th, 1931, that is, about seven months later, and the history was as follows.

His weight was approximately the same; in October he weighed 163 pounds and he now weighed 164 pounds. He stated that he felt better and the heart attacks were much less frequent and less severe; he could walk a much greater distance and, as a matter of fact, felt, as he put it, "tip top". He was also taking less nitroglycerine. There was no glycosuria during the interval. The blood sugar, in the fasting state, on this day was 0.188 per cent. But the most striking change of all was found in the electro-cardiographic tracing; with the exception of left ventricular preponderance and a slight degree of notching of the R-deflection in all leads, the electro-cardiogram was normal in all respects; the T's were upright and of a maximum magnitude, indicating 0.0002 volts, which is practically normal at the age; the P-R interval was 0.11 seconds; the Q-R-S occupied 0.09 seconds. As a matter of fact, the notching of the R-deflection was so small that our cardiologist, Dr. C. C. Birchard, regarded it as of no prognostic importance. The finding of left ventricular preponderance was, also, regarded as of little or no importance at the patient's age.

The interpretation which I would suggest of the above findings is that improvement was the result of supplying the heart muscle with the important food required for its proper function, namely, glycogen. Here, incidentally, we have a patient whose diet was changed from 50 grams of carbohydrate to 272 grams without the use of insulin with no resultant glycosuria nor increase of blood sugar, *in spite of the hyperglycemia immediately prior to the change.*

CASE 9

In the other, and somewhat similar case (Hosp. No. 5527/24), the changes in the heart muscle prior to the increase of carbohydrates in the diet were not as marked. However, following change of diet, the electro-cardiogram showed increase of the amplitudes of the Q-R-S deflections, and the T-deflections, from being almost zero in magnitude, increased to a normal size and contour.

EFFECTS OF TAKING LARGER QUANTITIES OF FAT THAN ALLOWED

The following case, because of the complete data and the reliability of the patient, is an

example of the possible effects of ingestion of larger amounts of fat than allowed in the diet.

CASE 10

(Hosp. No. 401/31), a girl, 23 years of age, was admitted to the Montreal General Hospital on January 21st, 1931, with a history of thirst and polyuria and a rapid loss of body weight for one month prior to admission. The results of the physical examination were essentially negative, other than the diabetes. On admission, the urine contained large amounts of sugar, some acetone bodies, and the blood sugar was 0.250 per cent in the fasting state. The high carbohydrate-low calorie diet was given on the "ladder" basis and on discharge from the hospital, February 2nd, the urine was free of sugar and acetone bodies, and the blood sugar was on the border-line of normal, namely, 0.122 per cent. The diet consisted of 236 grams of carbohydrate, 56 grams fat, and 72 grams protein. No insulin was required.

On the three subsequent visits to the diabetic clinic (February 28th, March 28th, and May 2nd), the blood sugar was 0.277, 0.208 and 0.333 per cent, respectively. In spite of careful examination, there was no reason to believe that this patient was not following the diet as prescribed; while in the hospital she was classified as "very reliable". On May 2nd, however, when it was explained that her blood sugar was not only not normal but high and increasing, and that we could find nothing to account for this, as there was no history of cold or other infection, etc., of her own accord she outlined her usual diet for the day. It was then discovered that she was inadvertently taking more fat than allowed; she was taking bacon for breakfast, assuming that, because it was lean, the fat content would not be greater than other lean meats.

Because of both the general condition and the laboratory data, it was considered that insulin was now necessary. As she was quite intelligent, she was not readmitted to the hospital but allowed to carry out instructions at home. She was to take ten units of insulin twice a day, one-half hour before the morning and one-half hour before the evening meal, and to commence treatment again by starvation and gradually increase the diet, following the same practice as when she was in the hospital, until it reached 236 grams of carbohydrates. This she did and the following were the results:—

Date	Blood sugar (per cent)
May 12th.....	0.147
May 18th.....	0.161
May 30th.....	0.200
June 13th.....	0.147
July 2nd.....	0.158

On July 2nd, because of the history of frequent, though mild, insulin reactions, the diet was increased to 254 grams of carbohydrate and the insulin dosage was reduced to ten units once a day. Since then, the urine has remained free of sugar and acetone bodies, and the blood sugar has been normal or nearly normal.

The plasma cholesterol data are rather striking. On discharge from the hospital the figure was 0.214 per cent. When the blood sugar had reached 0.333 per cent, because of the bacon, the cholesterol was 0.342 per cent. With return to her diet without the bacon, the cholesterol immediately dropped to 0.214 per cent, and the last reading was 0.185 per cent.

To summarize, we have here a young girl with an acute diabetes and rapid downward progress prior to admission to the hospital, who was able to tolerate a diet of 236 grams of carbohydrate without the use of insulin; who shortly after discharge from the hospital inadvertently increased the fat content of her diet, which act was followed by the loss of carbohydrate tolerance to the point

where insulin was required. With return to her proper diet, she was not only able to reduce the insulin disage by ten units but to increase the carbohydrate content of the diet to 254 grams.

TEMPORARY GLYCOSURIA WITH THE HIGH CARBOHYDRATE-LOW CALORIE DIET

Occasionally we meet with glycosuria in the absence of dietary indiscretion, but characterized by its temporary nature. The blood sugar in such cases is always normal or nearly normal in the fasting state, and without alteration of either diet or insulin the condition disappears and may shortly after reappear. From our studies so far we have no reason to believe that this temporary glycosuria is accompanied by loss of carbohydrate tolerance. Because of the importance of the recognition of the phenomenon and the necessity of further studies, a case is cited here as an example:—

CASE 11

(Hosp. No. 5147/31). A boy, 16 years of age, a diabetic of two years' duration, was admitted to the Montreal General Hospital on September 23rd. He had been attending the clinic for diabetes at this hospital since January, 1929. His diet since May, 1930, had consisted of 218 grams of carbohydrate, 56 grams fat, and 69 grams protein, and he was taking ten units of insulin twice a day. He was an ideal patient. The urine was always free of sugar and acetone bodies, and the blood sugar normal or nearly normal until November of the same year, when his mother died. With the radical change in home conditions, it was impossible for him to have proper treatment for some time. Though glycosuria appeared occasionally only, hyperglycemia was found for some time, practically at every visit to the clinic.

On September 12th, 1931, at his last visit to the outdoor clinic, he complained of a "painful lump" on the left cheek. He obviously had some deep inflammatory lesion; the skin over the affected area was normal in appearance. He was referred to the Surgical Clinic, from which, in turn, he was admitted to the hospital. While in the hospital, a diagnosis of actinomycosis was made. There was some febrile disturbance, and accompanying this, on admission, the urine contained sugar and acetone bodies, and the blood showed a marked grade of hyperglycemia, namely, 0.357 per cent. Because of the infection, he was not placed on a starvation diet but was given his usual food, namely, 218 grams of carbohydrate, 45 grams fat and 69 grams protein, and, according to our practice in infections, was given insulin every six hours rather than in relationship to meals. By giving him ten units of insulin at each dosage, the following morning the urine was free of sugar and acetone bodies, and the blood sugar was normal.

On October 14th, in view of the absence of glycosuria and marked hypoglycemia, the diet was further increased to 254 grams of carbohydrate, and the insulin dosage from ten units every six hours, that is, 40 units a day, to 15 units every eight hours, that is, 45 units a day. The blood sugar remained perfectly normal and, on October 21st, because of the marked hypoglycemia* the insulin was reduced to

*This is our second case of a glycemia without symptoms. The boy did not complain, nor were there any signs of an insulin reaction. There was practically no glucose in the blood. Thus:

Blood sugar before fermentation = 0.036 per cent
Blood sugar after fermentation = 0.034 per cent

True glucose = 0.002 per cent
(First case reported in *Am. J. Med. Sc.*, 1929, 178: 29.)

ten units every eight hours, at which level it has been kept, because of the persistent, though slight, discharge from the operative wound and occasional febrile reaction. For no apparent reason, a twenty-four sample of urine occasionally contains sugar and, *without change of diet or insulin dosage*, conditions adjust themselves the following day. Considering the diet, the amounts of sugar are small, ranging between 5 and 15 grams. As the blood sugar still remains normal, and as the daily urine is otherwise free of sugar and acetone bodies, it is difficult to associate this glycosuria with loss of tolerance. My impression is that, some time on these exceptional days, there is a temporary rise of blood sugar, and that, once the blood sugar has reached the renal threshold for glucose, sugar is excreted and excretion may continue for a short time, though the blood sugar may return to the normal or nearly normal. This phenomenon of excretion of sugar in diabetes in the absence of hyperglycemia, was referred to before by the writer in a study of renal glycosuria, and emphasized as a possible fallacy which has to be considered in the interpretation of blood sugar time curves.⁸

Incidentally, here we have a young diabetic whose diet consists of 254 grams of carbohydrate, and who requires thirty units of insulin a day only, in spite of the presence of an infection.

DISCUSSION

If I have created the impression that all of our results are as those reported in the cases mentioned, I wish immediately to state that they are not. We have had failures. I know of 16 of them and they have been very bad failures. However, in 3 of these the patients did not respond to the older diets. In the 13 remaining cases, failure may be definitely attributed to the dietetic management. May I, however, observe that we have now over 500 patients on this diet and that 16 failures among them is, at least in my opinion, a highly satisfactory state of affairs. Our comparative data also show that, providing patients follow the prescribed treatment, our results are more satisfactory and more uniform than with the older diets. Diabetics, in the final analysis, are only human; they are, therefore, very likely to err and, at times, because of the chronic nature of their disease, they err deliberately. For some time, we had a number of cases of glycosuria which, until the patients were readmitted into the hospital for study, we could not explain. We are, however, now quite convinced that, with very few exceptions, when the high carbohydrate-low calorie diet was not successful, it was not due to some fundamental fault with the diet, but to dietary indiscretion, inadvertent or deliberate, on the part of the patient.

The interesting question which arises is—Why is this diet successful? Experiences with it are incompatible with our present conception of the metabolism of diabetes. An explanation which suggested itself early in our experience was that

the results were due to its low caloric value. As is generally recognized, providing that these patients are treated on the principle of under-nutrition, it is possible to allow a variety of variations in the carbohydrate, protein and fat. Under-nutrition does not, however, explain the fact frequently noted, that it is possible to change the diet of an individual from 50 grams of carbohydrate, 150 grams fat, and 59 grams protein to 250 grams carbohydrate, 50 grams fat and 75 grams protein not only without the use of additional insulin but with less than required with the former diets; these diets are identical with respect to their caloric value. Past experiences also show that middle-aged diabetics tolerate a variety of diets. This, however, does not explain the good results with this new diet in the case of juvenile and adolescent patients.

In as yet some unknown manner, exposure to this diet appears to lead to an increase in the available supply of insulin. From Allen's classical experiments it was concluded that excess feeding of carbohydrates led to over-strain of pancreatic function in the partially depancrea-tized dog and loss of carbohydrate tolerance. The question which, therefore, arises is—"Why do not these high carbohydrate diets also lead to loss of carbohydrate tolerance? Not only do they not lead to loss, but, apparently, to improvement. The view held generally at present is that, in diabetes, there is defective production of insulin. Much of our experimental data to date fail to support this view. Diabetes does not appear to be due to defective production of insulin but to interference with the action of a normal supply. Experiences with diabetes complicated by infections are suggestive. The loss of carbohydrate tolerance in these cases is generally attributed to defective insulin production due to the infection. If this view is correct, how are we to explain the not infrequent experience that such patients are not able to make use

of the insulin injected hypodermically? As is well known, such persons may fail to respond to huge doses. These are some of the questions which, when settled, may give us a greater insight into the pathogenesis of this disease, and, it is hoped, lead to still further improvement in methods of treatment. Until more is known of diabetes, our treatment must be largely dietetic. From our experiences with the above mentioned routine procedure in determining whether patients do or do not require insulin, our conclusion is that the great majority do not; diet in the majority of cases still remains the most important factor in the treatment of diabetes, and it is my opinion that, providing individuals follow prescribed treatment, the high carbohydrate-low calorie diet can do much in not only keeping the patient alive but in keeping him relatively more comfortable. Parenthetically, may I state that, judging from practice, there are still a number of physicians, unfortunately, who misinterpret such observations and fail to use insulin in cases where its use is indicated. Such practice hardly requires comment.

In a recent appraisal of present day methods of the treatment of diabetes, Dr. Joslin⁹ very aptly pointed out that, in view of the satisfactory state of affairs reached, one should be slow to depart from standard methods. Innovation should be confined to hospitals with large clinics and available facilities for thorough study. May I, therefore, again state that were I at all in doubt about the value of this diet, I should hesitate to present it before a group of men who are likely to apply it in general practice.

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A SENSE OF HUMOUR.—Dr. E. Graham Howe in his lectures at Tavistock Clinic, London, discussing the motives and mechanisms of the mind, says: "It is not perhaps generally realized to what extent humour is defensive, its purpose often being to take the edge off a reality which is too unkind. This accounts for humour's close association with tragedy. If we can see the funny side of fear, guilt, and inferiority, we can also see them in some degree of perspective and they have largely lost their unconscious power over

us. To laugh when we are afraid helps to restore the balance of courage. . . . A sense of humour will always blunt the edge of inferiority, giving at least the more tolerable quality of the comic and ridiculous. Whether it be shortness of stature, slipping on a banana skin, or feeling sea-sick, it is always good to see it from the funny side. Growth and a sense of humour, then, are the psychological, normal, and desirable means by which we rid ourselves of the undesirable pathological feelings of fear, guilt, and inferiority."

SPASTIC COLON*

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SPASTIC (or irritable) colon is perhaps the best term to describe the condition so frequently encountered of recurring abdominal distress, gas and irregularity of bowel movement which is associated with spasm, or tonic hardening of a limited portion of the colon. At the outset, it must be recognized that spastic colon is a clinical description, not a pathological entity; no evidence of inflammation of the colon is present in the stools, on sigmoidoscopic examination, or in the post-mortem findings; there is indeed, no organic disease of the colon, even the tonic hardening being purely a temporary state. So, one should not include this condition under colitis which implies inflammation and to the lay mind often signifies a grave local disorder.

Spastic colon is a difficult subject to deal with. Our knowledge of the neuromuscular mechanisms underlying transportation downwards of the intestinal contents is very incomplete. We know that peristalsis of the colon is normally automatic, regulated by impulses from Auerbach's plexus, which, lying between the muscular layers of the colon, is stimulated mechanically and chemically by the intestinal contents and by hormones derived from the bowel wall (cholin) and elsewhere. Auerbach's plexus, though thus functioning largely reflexly in the intestinal wall and correlating the activity of one segment with another, is also influenced by impulses reaching it from the sympathetic and parasympathetic systems (the latter including the vagus and pelvic nerves). The main effect of stimulation of the sympathetic is inhibitory on the bowel, as shown in the paralysis of the digestive track produced by worry, fear and painful stimuli. In a general way, stimulation of the parasympathetic system through Auerbach's plexus increases the motility of the colon, but parasympathetic fibres pass also to the nerve plexus in the serous coat of the colon without pass-

ing through Auerbach's plexus; these fibres heighten the tone of the bowel and thus produce spasm or tonic hardening, interfering with, rather than promoting, the ready passage of faeces. Alvarez emphasizes that the effect of stimulation of any of the involuntary nerves is never the precise and logical response we see from stimulation of a cerebrospinal nerve, but is transient and uncertain.

While parasympathetic and sympathetic systems to some extent oppose and balance each other in the gastro-intestinal tract, yet Cannon has removed the entire sympathetic chain of nerves from many cats without any sign of the marked preponderance of vagus effects we might expect; some animals will live in apparent good health when not only both vagi but also the splanchnic nerves from the dorsal region of the cord have been cut, showing how highly automatic the digestive track can be.

While our knowledge of the motor mechanisms of the colon is thus incomplete, we are not better instructed on the sensory side. The colon is insensitive to cutting, pinching and burning. Lennander, and even Sir James Mackenzie, held that no true pain is felt in the viscera. Mackenzie admitted that the viscera are supplied with afferent splanchnic nerve fibres, but he believed that stimulation of these nerves gives rise not to pain in the viscus but to pain and tonic muscular contraction in the external body wall supplied by the corresponding spinal nerves. For, he assumes, stimulation of afferent nerves from the colon sets up a heightened sensitiveness in the corresponding spinal segments of the cord to which these afferent nerves stream; the spinal nerves within this irritable focus of the cord are stimulated, the sensory giving rise to the hyperalgesia and the motor to the protective muscular contraction in the corresponding segments on the abdominal wall.

There is, however, increasing agreement that true visceral pain does exist. Hurst and others have shown that it is simply a question

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of the type of stimulus; insensitive to cutting, pinching and burning, the bowel responds with true visceral pain to increased tension on its muscular wall. Only in this way can we explain the sensation of fullness after meals and increasing discomfort often present before a movement of the bowels, while Carlson has shown that the sensation of hunger depends on the state of tension in the gastric muscular coat. Referred pains too, undoubtedly exist, but Morley¹ and others have recently brought forward much evidence against Mackenzie's view that pain is referred from the visceral wall through the splanchnic nerves to the corresponding somatic segments supplied by cerebrospinal nerves. It is well in any case to recognize that these visceromotor and viscerosensory reflexes of Mackenzie are as yet not supported by histological or physiological evidence. Morley has particularly pointed out that irritation of the peritoneal lining of the under surface of the diaphragm, supplied though it is by the phrenic, produces referred pain on the tip of the shoulder—the corresponding somatic segment to the phrenic nerve which comes mainly from the 4th cervical segment. In this case, he argues, the reflex pain in the shoulder tip is simply from irritation of the phrenic through the posterior root ganglion or posterior column to the corresponding subcutaneous nerves and there can be here no question of reflex from viscera to corresponding somatic segments; so, referred pain experienced in the abdominal segments is similarly derived from stimulation of the corresponding anterior peritoneum adjacent to the viscus involved—that is from cerebrospinal nerves supplying the anterior peritoneum to their subcutaneous branches.

In any case, pain referred to somatic segments is generally the result of inflammatory disease, as in the splinting of the abdominal wall in appendicitis and in chronic ulcer with subacute perforation. Thus in uncomplicated spastic colon, where there is no inflammatory change, we do not find associated referred pain, but simply a true visceral pain, due to increased tension in the muscle fibres of the colon. This absence of referred pain, of protective spasm and hyperæsthesia, is of importance in the diagnosis of spastic colon.

Clinicians are not agreed as to whether

visceral pain can be localized or not. Visceral pain is generally conceived as similar to Head's protopathic sensation—primitive, deep-seated, ill-defined, localized usually as a dull and heavy continuous ache towards to the middle line of the abdomen, though sometimes intermittent or spasmodic, but never griping or rhythmical as in colic. Ryle, however, and, I think, rightly, claims that visceral pain in spastic colon is usually more accurately localized by the patient, who can often mark out the line of the affected portion of the bowel.

The underlying disease may be gauged by the x-ray appearance of the large bowel; frequently a contracted distal colon in which the haustral markings are lost is seen along with a dilated cæcum and ascending colon. Not uncommonly, there is hypermotility of the proximal colon, the faecal mass reaching the splenic flexure in record time, but being delayed by spasm in the lower half of the colon and by retrograde transportation, or possibly active antiperistalsis. The x-ray appearances support the view that in spastic colon there is a tonic hardening, with rigidity and narrowing of the lumen of some portion of the colon, a condition which may last for hours or even for days. Such an appearance has been seen repeatedly by surgeons in spastic ileus, associated sometimes with the passage of a gall-stone, or even with a round worm in the colon, but usually without obvious explanation beyond, possibly, the nervous hypervagotonic state. The x-ray narrowing of the colon is over too wide an area generally for malignant disease to be seriously considered, but it may be localized to an inch or two of the bowel, disappearing however, within 36 hours under *tr. belladonnæ*, *m.x.*, *t.i.d.* It must be emphasized that spastic colon should never be diagnosed on the x-ray findings alone—the clinical history and general examination are all important; the x-ray is valuable in excluding more serious conditions and in corroborating the clinical diagnosis of spastic colon.

ETIOLOGY

Spastic colon, which seems to be on the increase, is met with more often in women and particularly in the early years of life; it is commoner in private than in hospital practice.

There is usually a history of constipation, and often this condition has been treated over long periods with irritating aperients, the importance of which in the causation of spastic colon has been specially emphasized by Spriggs.² These aperients "interfere with the rhythm of the bowel, setting up inhibitions and spasms, causing first a too rapid passage and later local stases; they render the fæces more fluid than they should be and thus favour abnormal bacterial and putrefactive growth". But in a minority (20 of 50 cases in Ryle's³ series), the bowel function is normal and it is important to remember this possibility in spastic colon. In these cases especially an unstable nervous system is present, and colon manifestations may arise acutely following severe financial strain, illness in the family, or social conflicts. As Ryle says, it is extremely rare to meet with spastic colon in fair-haired, blue-eyed, healthy complexioned types with placid dispositions, or in robust people.

SYMPTOMATOLOGY

Abdominal distress is the outstanding symptom. Seldom acute and severe like renal or biliary colic, it is usually a dull, wearing, continuous ache, recognized as deep-seated, never indicated by a point, but referred sometimes vaguely to the epigastrium or below the navel, though frequently to the right or left iliac fossa or under the left costal margin. Such more precise localization is likely if the patient is actually seen in an attack, or is warned to note closely the position and type of distress he suffers; it is surprising how indefinite the history may otherwise be. The distress may last for some hours, or even for a few days, with little intermission. It may be definitely precipitated by emotional disturbance, by chilling, by neglected constipation or by unsuitable purgatives. The patient may be uneasily aware of distension and gas in the bowels, and may get partial relief by the passage of flatus. Ordinarily no association is noted between the pain and the taking of food, though an important exception will be touched on later. There is usually, but not always, a history of constipation; small flattened or even loose stools are frequently passed without relief. Salts and drastic purgatives make matters worse, though 2 to 3 tablespoonfuls of castor oil will usually

bring an attack to an end. There is frequently nausea but seldom vomiting. The sufferers are tired and depressed as a rule; they may have lost appetite and considerable weight, and may suspect they are suffering from grave organic disease.

On physical examination, always during, and frequently between, attacks the colon is tender and can be usually felt as a firm, contracted cylinder of the size of a lead pencil or little finger in some part of its course. The cæcum may be thus palpated as a firm, tender and narrow sausage, or the sigmoid may be involved, while the transverse colon more often escapes. It should be noted that the sigmoid is palpable in perfect health, and I think (though Ryle is doubtful) that the cæcum and ascending colon can often be mapped out in the absence of any suspicion of abdominal disease. Such sausage-like thickening of the colon may exceptionally raise the question of new growth, but the physical findings vary from day to day in spastic colon, while visible peristalsis and blood in the fæces is absent.

Rectal examination should never be neglected. Fissures and inflamed hæmorrhoids may give rise to rectal spasm; chronic pelvic inflammation may help to induce spasm in the bowel higher up, while as Stacey Wilson⁴ and Ryle⁵ point out, a ring of cartilaginous feel from spastic contraction may occasionally be felt per rectum. The sigmoidoscope may be advisable in doubtful cases and will show a normal mucous membrane with absence of the characteristic inflammatory or ulcerative picture seen in simple or ulcerative colitis.

The fæces may be narrow and fragmented if the rectum be involved in the spasm, or may consist largely of round little balls like sheep's droppings. Apart from the so-called *colica mucosa*, no mucus is seen, except as a thin, protective coating over hard masses of fæces. While no physician would dream of treating a nephritic patient without careful examination of the urine, too often he neglects the equally important examination of the stools in suspected colonic disease. The gross appearance of the stools often gives a hint, and in all doubtful cases microscopic examination for undigested food residues should be combined with chemical and microscopic examination for blood, pus and parasites.

Cases of *colica mucosa* (formerly called mucous colitis) which are, in my experience, quite infrequent in Winnipeg, may well be included along with spastic colon, though the pain is usually more severe, the tenderness generally confined to the sigmoid, and masses of mucus are passed in the attack. There is no evidence of colitis, either on sigmoidoscopic examination or on microscopic examination of the mucus, which proves practically free from polymorphonuclear cells.

In spastic colon diarrhoea may alternate with constipation and the patients are notoriously intolerant of purgatives. Many are painfully aware of their poor digestion and have restricted their diet more and more; serious loss of weight may follow and increase the suspicion of organic disease.

One type of spastic colon, must be particularly noted. Here epigastric distress or actual pain comes on in irregular attacks, sometimes soon after, sometimes 2 to 3 hours after, meals, and in the latter case is relieved by food or baking soda; the distress may even waken the patient at night. Peptic ulcer is thus closely simulated, or, occasionally, gall-bladder disease is suspected. Owing to the persistence of symptoms in spite of treatment directed towards the supposed ulcer or cholecystitis, operation is sometimes performed. No ulcer is found; the gall-bladder may be held to be suspicious and removed, along with an innocent looking appendix, without, however, relief of the symptoms. A hint may be given of the underlying condition by the associated bowel symptoms—fullness over the lower abdomen, nausea, irregularity of the bowels, with relief of distress by passage of gas downwards. The history, too, when analyzed, rarely gives a straight-cut story of ulcer or typical gall-bladder dyspepsia. Such cases of spastic colon are not uncommon and seem to be on the increase. They have been specially studied by Smith and Paul⁶ and Fowler, who found that the experimental introduction of about 500 c.c. of air into the colon by rubber bulb through a rectal tube was followed at once by a striking increase in the tone of the pyloric end of the stomach, by more active gastric peristalsis, and by the appearance of the typical epigastric distress. The free gastric acidity, by the fractional method, they found to be generally low.

Von Noorden,⁷ on the other hand, had found hyperacidity in 70 to 80 per cent of his cases of spastic colon; and had explained the ulcer-like symptoms he also noted occasionally by the accompanying hyperacidity and pyloric spasm from vagus hypertonus, of which, of course, spastic colon is itself a manifestation.

From the above description of symptoms met with in spastic colon, it is obvious that there is no evidence of organic disease; that in fact, the general nervous make-up of the patient is the prominent factor, the colon merely bearing the brunt of the nervous irritability in spastic colon, just as the respiratory track does in asthma. Spastic colon may, of course, be associated with organic disease in the abdomen, such as chronic cholecystitis, peptic ulcer or chronic pelvic disease; enteroptosis is often associated and sometimes redundant loops of the sigmoid are present.

DIAGNOSIS

A careful history is the first essential. The more one sees of these cases, the more convinced one becomes of the necessity of a painstaking and unhurried history. The actual examination during an attack of distress has obvious advantages, as the exact area involved is more accurately localized and precise data are obtained about the type of pain, with possible deep or superficial tenderness.

The vexed question of *chronic appendicitis* arises. When there is no history of an acute attack of appendicitis, the casual removal of the appendix (an operation till recently so much in vogue) has given unsatisfactory results for indigestion, with chronic aches and pains in the right iliac fossa and tenderness at or near McBurney's point. Equally unsatisfactory in such cases has been the surgical experience in freeing the cæcum and ascending colon from bands and membranes on the one hand, and stitching in place the abnormally movable cæcum and ascending colon on the other. Now one may almost gauge the surgical conscience of a community by the restricted number of operations for chronic appendicitis. Spriggs notes that even 30 years ago Treves regarded colitis as the chief reason for the failure of appendicectomy to relieve symptoms, while Ryle, in England, and Liek,⁸ in Germany, emphasize that spastic colon

is the common cause of persisting or recurring pain in the right iliac fossa.

Especially in young women of enteroptotic build does one encounter a tender palpable cæcum and ascending colon with delay in the onward movement of the fæces (the "ascending type" of constipation); spasm in the transverse colon or lower down is associated and is often the prime factor in the delay. The nervous make-up of these patients is obvious at a glance, and must be steadily in the physician's mind in planning treatment and in guarding as far as may be against recurrences later.

The mimicry of *peptic ulcer* by spastic colon has been referred to. A careful gastro-intestinal x-ray examination is often necessary, for the Mayo Clinic claims that 95 per cent of duodenal ulcers can be diagnosed by the x-rays, while the x-ray appearances in spastic colon are fairly characteristic. It must be remembered, however, that the spastic state is intermittent and the x-ray examination may thus show nothing, while slow distension of the colon by a large barium enema may overcome the spasm temporarily. Incidentally, the prolonged use of Sippy's magnesia powders sometimes gives rise to an irritable condition of the colon.

The dyspeptic form of *gall-bladder disease* may be mistaken for spastic colon, though the converse mistake is, I think, far more common. With this possibility in view, a careful history, the possible presence of protective muscular spasm in cholecystitis, the greater incidence of gastric anacidity, and the failure to visualize the gall-bladder by Graham's method, should settle the diagnosis in favour of the gall-bladder.

When the principal pain and tenderness in spastic colon are referred to the left iliac fossa, *diverticulitis* has to be considered, especially in stout and middle aged men. *Ulcerative colitis*, with its accompanying blood and pus in the stools and severe anæmia, should seldom present any difficulty in diagnosis.

The tired and anxious patient with spastic colon may impose as simply neurotic—a serious error from the therapeutic standpoint. Finally, when a patient with chronic abdominal distress is operated on with negative findings, spastic colon must be considered as the possible explanation.

TREATMENT

The first duty of the physician is to reassure the patient as to the harmless nature of the trouble and to emphasize that spastic colon is not so much a disease of the digestive tract as a local response of an excitable nervous system. Many will readily concede that from childhood their worries "went to their stomach". Regulation of the patient's life, readjustment of his philosophy of life (so easy to suggest, so difficult to practice!), his work and play, demand consideration. A holiday, even at times a short rest in bed, combined with hot fomentations to the abdomen may be necessary at the outset, and if sleep be broken, or the patient particularly nervous, the passing use of 30 grains of bromide, or 10 grains of adalin, at bedtime may be very helpful.

A smooth, mixed diet is given. Condiments and highly seasoned articles; indigestible foods like lobster, salmon and pork, bran, tough skins and seeds, coarse vegetables, iced drinks and coffee are forbidden. Milk sugar, 1 to 2 tablespoonfuls in water daily, stewed fruit without seeds, purée of vegetables, dried out brown bread with plenty of butter, are suitable, together with fish, chicken and little meat, eggs, well-cooked, fine cereals and simple desserts; a tumbler of acidophilus milk, 2 or 3 times daily, may be helpful. The general nutrition must be considered, and if the patient be undernourished, easily digested fats, such as butter and cream, are particularly indicated.

Purgatives and large enemata should be absolutely forbidden, though a single large dose of castor oil, tempered with 7 or 8 drops of laudanum may be necessary at the outset, to clear the intestinal track, or a large, warm enema of normal saline given very slowly. In severe cases, 4 or 5 ounces of warm olive oil introduced into the rectum every night for a few nights, and then 2 to 3 times a week, is sometimes useful at the beginning of treatment.

The influence of atropine in abolishing spasm is readily demonstrated on repeated x-ray examination, and its systematic use in spastic colon is advisable. The tincture of belladonna may be given in 10 minim doses three times a day, or, better, atropine, gr. 1/200, twice a day with gr. 1/100 at night. The dose may be increased till the physiological effect of dryness of the mouth and commencing difficulty in

reading is experienced and should be continued just short of the physiological dose for some weeks, sometimes even for a month or two, and then only gradually reduced. The drug is frequently omitted much too soon, and the dose given is often insufficient. Two tablespoonfuls of flaxseed after meals, with a teaspoonful of liq. paraffin at night, often act well when combined with the suitable diet and atropine. Under these measures, the symptoms of spastic colon are at least greatly relieved and some-

times disappear entirely, but they are apt to recur with overwork, worry, or marked indiscretions in diet.

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THE CLINICAL AND RADIOLOGICAL ASPECTS OF PYELOGRAPHY, INTRAVENOUS AND RETROGRADE*

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UROGRAPHY, certainly uretero-pyelography, is, in the opinion of many of us, one of the most valuable procedures in urological practice. As cooperation of the closest sort between urologist and roentgenologist is required, it is very appropriate that we who constantly practise it in our daily work should be associated in this symposium. Such a cooperation is not only helpful and valuable, but essential, and neither specialist working alone may hope to obtain as good results as when the fullest cooperation is mutually observed. This observation is timely in view of the newest development of pyelography, the intravenous or 'excretion' urogram. For while a roentgenologist cannot hope to make retrograde pyelograms, though he may interpret them wisely, there is a danger of his attempting to make urological diagnoses on the basis of excretion pyelography alone. The danger of this cannot be too strongly emphasized. Experienced urologists and roentgenologists are not likely to be tempted by this alluring short cut.

The passage of over a year since uroselectan was introduced—the first drug to give practical results in intravenous urography—has enabled us to evaluate more clearly not only its worth and that of its substitutes but to assess accurately the place it occupies among urological and

roentgenological procedures. If it was ever thought, or hoped, that it would supplant retrograde pyelography, such has been proved to be erroneous, and it is rapidly finding its proper place as a supplement or complement to the older method and other associated diagnostic aids in urological diagnosis. Though, at times, one or other method will give the most information, both methods have a definite value as adjuncts to accurate urological and x-ray diagnosis. Urological diagnosis can be made, but rarely, by the use of any one method. It is only by the most careful summation and coordination of all factors, the case history, the general physical and special examinations, laboratory tests, cystoscopy, and the x-rays, that a thoroughly sound diagnosis is attained. There should be no implication of controversial opposition between the two methods. Each of them will, at times, appear to better advantage, as contrasted with the other, and it is to a consideration of these points that your attention will be mainly directed.

It must be remembered that the retrograde pyelogram depends upon the use of the cystoscope, and that at the time the pyelogram is made other information equally valuable, in fact, essential information, is or should be obtained with respect to all portions of the urinary tract. There is the danger, we repeat, that in relying on excretion pyelography alone, except in certain cases where only gross information regarding the kidneys is required, essential and

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necessary procedures are omitted, and faulty or incomplete diagnoses are the result. The successes and failures of retrograde pyelography are well known to us all, after long experience with its use. At times, it leaves us absolutely in the lurch, from failure to find or to catheterize the ureteral orifices, or to insert the catheter sufficiently high or past an obstruction. Even under apparently favourable circumstances of catheterization we may fail to obtain a pyelogram. Under such conditions, the intravenous pyelogram may give valuable supplementary information.

So much has been written on the subject of intravenous pyelography that all should be well informed as to its advantages and its weaknesses. Briefly, this method is most useful where an obstruction is present, permitting a damming up of the urine, provided that the kidney has secreting power, and in cases in which cystoscopy or ureteral catheterization is impossible for various reasons. Various methods have been used to simulate stasis, such as ureteral compression, the Trendelenburg position, previous limitation of fluids, etc. On the opposite side of the picture its weaknesses result from the fact that it occasionally fails to give satisfactory outlines of the kidney pelvis and calyces, and does not always show the finer details of calyces, except when an obstruction is present. This probably depends on alterations in, or modifications of, the renal function. The method presupposes a degree of functional activity of the kidney to permit of the excretion of the drug. This has led to assertions as to its value as an indicator of renal function which have not been entirely substantiated. Where minor deformities are present the retrograde pyelogram gives better definition. The method may be of value in children. In cystoscopy, if an anæsthetic is used, as is frequently necessary, the respiratory movement is liable to interfere with good visualization in a retrograde pyelogram. The intravenous pyelogram may give the desired information, though it is subject to the same limitations as in the adult.

Intravenous pyelography promised to be of value in conditions where cystoscopy or bilateral pyelography was inadvisable or dangerous, for example, in lower tract obstructions, prostatic enlargement, etc. Our experience is

that intravenous pyelography in this class of case has given most disappointing results. This may be caused by the deficient renal function which may be expected in such cases. Those urologists who fear to practise bilateral pyelography will obtain much assistance from the intravenous pyelogram, in that information is gained as to the opposite kidney, which information is not given by the unilateral pyelogram. It gives a composite picture of the urinary tract, including visualization of the bladder, though this is often obscured by excessive amounts of gas in the intestinal tract, which occasionally seems to follow its use.

From published reports, one might assume that intravenous pyelography was completely satisfactory and successful in a large percentage of cases. The illustrations almost invariably selected for reproduction are naturally the striking cases, so often of the obstructive types, which lend themselves to pleasing pictorial reproduction. We have thought it would be interesting to present an analysis of our cases, in an endeavour to assess impartially its successes and its failures. We would point out that the method is not used routinely in our service, partly on account of the high cost of the drug, and partly because we are convinced that cystoscopy is essential to proper urological examination. Intravenous pyelography has only been used, therefore, when information was needed that was not supplied by the retrograde method. In addition, cases of various types of lesions have been selected for examination by both methods for experimental and comparative reasons. From these we have been enabled to make valuable comparisons between the two methods.

As regards visualization of the urinary tract, we have found that the intravenous method has been unsatisfactory in approximately 50 per cent of the cases. Berry says that in the urological clinic of the Royal Victoria Hospital the method was found to be satisfactory for diagnostic purposes in only about two-thirds of the cases, but was never so satisfactory as the retrograde method.

We have analyzed our results from another point of view. As to our ability to draw conclusions by the use of the intravenous pyelogram alone, this was possible in but 25 per cent of the cases. This group includes the

cases in which the intravenous method gave information not furnished by the cystoscopic approach, or supplementary information which was essential to diagnosis, or made diagnosis conclusive. In 50 per cent of the cases, the intravenous method was of absolutely no value in coming to any conclusion. In the remaining 25 per cent of the cases of our series, the information obtained by both methods was of equal value, more or less. It is to be noted that even in the first group, where the intravenous method gave perfect satisfaction, in only a few instances might cystoscopy have been omitted. For instance, in a suspected tumour of the upper abdomen, a normal kidney picture obtained by intravenous pyelography would exclude renal responsibility, and further urological investigations might be dispensed with.

Hydronephrosis.—Our best pictures have been obtained in this condition. Generally speaking, the intravenous method will visualize a large hydronephrosis better than the retrograde, possibly because, in the latter, of the irritation of the injected medium producing a pelvic contraction. There are exceptions, particularly with hydronephroses of lesser degree, where finer details are given by the retrograde method. We would also point out that the intravenous method will not always permit of conclusions being drawn as to the etiological factor producing the hydronephrosis, so as to indicate the type of operative interference. Moreover, there will still remain the necessity of testing the functional ability of the kidney.

Renal anomalies.—The detection of anomalies of the urinary tract, which are so often complicated by hydronephrosis, will be much facilitated.

Calculi.—The shadow of a calculus will often show to better advantage in an intravenous urogram than in the retrograde, the density of its shadow being greater than that of the intravenously administered medium. The intravenous method has been of service in ureteral calculi, in outlining the ureter and kidney above the point of an impassable impaction, which had been impossible with the retrograde method. One of our cases showed the ureteral catheter obstructed below the shadow, and no opaque fluid passing beyond it. The intravenous pictures showed a large

hydronephrosis, with progressive filling of the ureter down to the calculus. Curiously enough, in a similar case there was absolutely no filling of the kidney above the stone up to the time the last picture was taken, one hour afterwards. At operation, the kidney pelvis was found distended with urine, and the kidney itself appeared to be absolutely normal as to secreting power.

An interesting comparison between the two methods is furnished by a female patient who suffered from left renal pain and pyuria. The x-ray revealed shadows on the affected side, suggesting either calculi or a calcified renal tuberculosis. She had suffered from tuberculosis of the left hip in childhood, and this joint was deformed in such a way that the right ureter could not even be visualized through the cystoscope. The left ureter was catheterized, and a satisfactory pyelogram obtained, showing the shadows to lie in the lower calyx. It was essential to have information as to the function of the opposite kidney, as a nephrectomy of the diseased kidney was a possible necessity. In spite of the most acrobatic contortions of the cystoscopist, owing to the position of the ankylosed and deformed left hip, the ureter could not be seen, either to catheterize it or to observe the ejection of indigo-carmin from it, the substance which was injected intravenously as a test of function. Our first examinations were made before intravenous pyelography was available, and one of our first attempts with the new method was made with this patient. The intravenous pyelogram was sufficient evidence of the presence of a right kidney with good function, but on the diseased side the picture was not so satisfactory as that obtained by the retrograde method, and, alone, would not have been entirely sufficient for diagnosis.

Tuberculosis.—A recent series of three cases of renal tuberculosis has been met with in which it was impossible to catheterize the ureter on the diseased side, either not at all or for a sufficient distance to secure pyelograms. In all three, the intravenous pyelogram gave a clear picture of the diseased kidney, the dilated and strictured ureters. Formerly, by the older method, a diagnosis could only have been made by inference, or after repeated examinations and with much less exactness. In two other cases, the intravenous urogram failed to give

sufficient information as to either kidney. In one case the retrograde gave a picture of a stricture and dilated ureter which was pathognomic of the disease.

Renal tumours.—We have examined only one case in which comparative studies were made. The intravenous method in this case gave more information than the retrograde. von Lichtenberg has stated that his own results were none too satisfactory. Possibly, the perfected drug will show finer details, though in his latest communication he does not claim any superiority. In one case of congenital polycystic kidneys we obtained a satisfactory and diagnostic picture. For those who have refrained from using bilateral pyelography, the method will undoubtedly prevent many errors in this condition, as in many other bilateral conditions.

VISUALIZATION OF RENAL FUNCTION TEST

It is admitted that if a kidney pelvis is clearly visualized within ten minutes after the intravenous injection, renal function is within normal limits. Lack of shadow does not necessarily indicate lack of secreting power of the kidney, or absence of the kidney. Various factors will prevent good visualization of normal kidneys, such as obesity and temporary inhibition of function. This was noted in the case of ureteral calculus to which we have referred. Such an inhibition of function in a kidney with calculus has been noted after the passage of the cystoscope and the ureteral catheter. It is to be noted, also, that in conditions of stasis, visualization of the renal shadow will be increased. From this it must be concluded that while intravenous renal visualization offers a fairly accurate test of the kidney's function when a positive shadow is found, yet in its absence, methods of investigation based upon cystoscopy and ureteral catheterization will be required.

TECHNICAL CONSIDERATIONS

Our experience has been based upon the use of two drugs, uroselectan and skioldan. It is insufficient to enable us to draw comparisons between them. The method of administration has been by gravity, the time taken being from six to ten minutes. The pictures were taken, in the case of uroselectan, fifteen, thirty and sixty minutes, respectively, after injection was commenced, and with skioldan after twenty and

forty-five minutes. We have arrived at the practice of Braasch, *viz.*, to take two pictures, one early, in the first fifteen minutes after injection was commenced, the other later, forty to forty-five minutes after. These are usually sufficient to detect a rapid or slow elimination of the drug. No severe reactions were noticed. Nearly every patient complained of universal flushing, about three minutes after commencing the injection, lasting up to 45 minutes. Three cases vomited. One patient, with ureteral calculus, complained of pain in the diseased kidney, reproducing the colicky pain of the disease. This was the case in which no visualization was noted above the calculus. One patient complained of headache.

It has been a matter of general expectation that rapid advances would be made in this domain, particularly by the discovery of new drugs, with less toxicity, more rapid elimination, and more perfect visualization. Already von Lichtenberg has been experimenting with five new compounds—D34, D50, B1015, D40 and Sch.122, of which D40, or uroselectan B, seems to have the most advantages. These drugs require a much smaller dosage, and need only one to three-fifths the quantity of iodine previously considered necessary. With D40, only 20 c.c. are required. Better visualization is reported with 2½ grains of D34 than with 12 grains of uroselectan. Further, the elimination of these new substances occurs much more rapidly and in greater concentration than in the case of the old substances. With D40, which gives the highest concentration of all, the maximum is obtained 15 minutes after injection.

CONCLUSIONS

Diagnosis is made by no single method, but by a careful summation and coordination of all data obtained from a careful case history, general physical examination, and laboratory, cystoscopic and x-ray findings.

Intravenous pyelography is a worthy acquisition to the urological and roentgenological armamentarium, and a procedure whose value is likely to be enhanced in the future as improved drugs are made available and we gain by experience an increased skill in the interpretation of intravenous urograms.

The use of retrograde pyelography is

obviously barred from those without urological training.

The use of intravenous urography by those untrained in urological practice is strongly to be deprecated, and the interpretation of the

data furnished by it, if unsupported by cystoscopic information, should be made with the utmost care and conservatism.

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STUDIES IN CHOLESTEROL METABOLISM*

2. BLOOD CHOLESTEROL IN VARIOUS CONDITIONS

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IN a previous study¹ we were able to study the physiological variations of the blood cholesterol in normal individuals. Cholesterol tolerance curves were obtained following the ingestion of large amounts of cholesterol. During the course of this work we were frequently confused by a recurring reference to a seasonal variation in the blood cholesterol. The only authoritative proponent of this theory has been Currie², who, without publishing full data, came to the conclusion that the average blood cholesterol in normal persons was much higher during the summer months than in winter. This he attributed to seasonal dietary customs. This unconfirmed observation has been the *bête noire* of many workers in this field, and until it has been refuted much work of recent times remains of little value.

During the course of the present study, the blood of normal individuals was examined throughout the year for cholesterol content. In every case five estimations were made while the patient was in the fasting state. The mean of all estimations are shown in Table I.

TABLE I

	No. of Cases	Average cholesterol mg. per 100 c.c.
January to April.....	13	159
May to July.....	11	165
August to October....	7	152
November to January.	6	157

From these significant figures we deduce no evidence for any seasonal variation in the blood cholesterol of normal individuals. It is possible that Currie's figures were the result of the wide normal fluctuations of the blood cholesterol recently reported.¹

*From the Department of Medicine, University of Manitoba. The first instalment of this Study may be found in the *Journal*, 1932, 26: 30.

BLOOD CHOLESTEROL IN PREGNANCY

Twenty years ago, Chauffard³ found an elevated blood cholesterol during pregnancy. This finding has been confirmed by others (^{4, 5, 6, 7, 8, 9, 10, 11, 12}). The maximum figures were found in the later months of pregnancy and, according to some, there was a return to normal within ten days after delivery. The excess cholesterol is rapidly excreted in the bile and the milk during the puerperium. During the pregnant state there is a diminished cholesterol content of the duodenal bile, as shown by Pribham⁵. No figures are available for the cholesterol content of the gall-bladder bile during pregnancy, a problem of the utmost importance in view of the frequent occurrence of gall stones in these persons. In a recent article, Rosen and Krasnow¹³ believed hypercholesteræmia to occur in 66 per cent of normal pregnant women, but their upper limit of the normal amount was arbitrarily taken as 180 mg. per cent, a figure much too low. Taking 200 mg. per cent as the upper normal, their figures show only 38 per cent with an elevated blood cholesterol. Gardner and Gainsborough¹⁴ do not believe that a constant hypercholesteræmia occurs in pregnancy.

In the present study some 140 estimations of blood cholesterol were made during pregnancy and the puerperium. All specimens were drawn at ten o'clock in the morning while the patient was in the fasting state. The method of Bloor, Pelkin and Allen¹⁵ was used throughout. The results are shown in Tables II, III and IV.

In the pre-natal figures it will be seen that a significant rise in blood cholesterol does not occur until about six weeks before delivery. The percentage of cases above normal is about 30 per cent at this time, rising gradually to 80 per cent upon the day of delivery. Seventy-

TABLE II
BLOOD CHOLESTEROL IN PREGNANCY FOR 12 DAYS
POST-PARTUM

Cholesterol mg. per 100 c.c.	Observed cases	Percentage frequency	Absolute frequency
140-149	2	2	2
150-159	3	3	1
160-169	4	4	1
170-179	9	9	5
180-189	18	16	9
190-199	25	22	7
200-209	39	35	14
210-219	58	52	19
220-229	74	66	16
230-239	81	72	7
240-249	91	81	10
250-259	102	91	11
260-269	106	95	4
270-279	110	98	4
280-289	111	99	1
290-299			
300-	112	100	1

TABLE III
AVERAGE BLOOD CHOLESTEROL FOR 12 DAYS
POST-PARTUM

Day after Delivery	Number of estimations	Mean mg. per 100 c.c.	Percentage of cases above normal
1	14	216	78
2	15	218	80
3	11	210	81
4	13	220	76
5	11	223	81
6	8	211	62
7	11	227	66
8	12	211	61
9	7	229	85
10	8	231	75
12	2	203	50

112

eight per cent of the post-partum group of 112 cases show beyond all question a very marked hypercholesterolaemia. Isolated estimations up to three weeks post-partum have shown that in many cases this hypercholesterolaemia is still existent at that time.

CONCLUSIONS

1. A seasonal variation in the blood cholesterol of normal individuals does not exist.

TABLE IV
MEAN CHOLESTEROL VALUES IN PRE-NATAL STATE

Weeks before delivery	Cholesterol mg. per 100 c.c., average
26	173
22	211
17	207
14	202
10	181
9	197
8	211
6	269
4	216
3	268
2	240
1	230

2. A marked elevation of blood cholesterol is found in some normal pregnant women, beginning about the sixth week prior to delivery.

3. This elevation is not universal, but affects about 30 per cent of women six weeks before childbirth, rising gradually to 80 per cent on the first day after delivery.

4. The figures show little tendency to fall up to the twelfth day post-partum. Isolated elevations have been found up to three weeks after delivery.

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ABORTIFACIENT APIOL POISONING.—Trillat, Michon and Thiers state that apiol, formerly regarded as non-toxic, is very commonly used in France as an abortifacient. They record the case of a woman who admitted having swallowed in three days thirty capsules, each containing 20 cg. of the active product. Abortion ensued, and a week later she was admitted to hospital in a state of collapse, with a temperature of 104°. The general condition improved, but an almost complete anuria followed with great increase of the blood urea (3.29 grams). Bilateral decapsulation of the kidneys was followed by re-establishment of diuresis, complete in a fortnight. This urine, however, con-

tained only 1 per cent of urea, and at the time of death, thirty days after the operation, the blood urea had risen to 8 grams. Other symptoms were diarrhoea, bleeding from the gums, buccal gangrene, and coma. At the necropsy the uterus, peritoneum, liver, spleen, and lungs appeared normal. Hæmaturia has previously been described as following apiol ingestion, but the present authors have been able to trace only one other fatal case; in this the death occurred on the thirteenth day from diarrhoea, icterus, epistaxis, bleeding from the gums, and uræmic coma with anuria.—*Bull. Soc. d'Obstét. et de Gynecol. de Paris*, October, 1931, p. 615.

THE BLOOD CALCIUM DURING PREGNANCY*

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PREVIOUS investigations relating to the blood calcium in pregnancy have resulted in conflicting opinions concerning the behaviour of this element during the various stages of gestation. Perusal of the literature reveals the fact that, while considerable work has been done on the problem, many of the published data are contradictory in nature. A brief review of the more important contributions bearing on the subject will serve to verify this statement.

The observations of Bar¹ indicate that the utilization of calcium by the fetus varies considerably during the various periods of its development. Bosworth and Bowditch² estimate that the fetal demand for calcium increases from 0.006 g. per day during the first four months of gestation to 0.06 g. per day at term. Observations such as these naturally give rise to two questions, as suggested by Widdows:³ (1) Does the concentration of calcium in the blood of the mother show a decrease coincident with the increased demand on the part of the fetus? or (2) does a calcium metabolic balance exist, whereby the calcium level of the mother's blood remains practically constant during pregnancy?

Many attempts have been made to provide answers for these questions. For example, Mazzocco and Moron⁴ have shown the blood calcium of pregnant women to be lower than that of non-pregnant women, also the blood calcium of healthy puerperal women to be slightly higher than that of pregnant women. Bogert and Plass⁵ found that the average blood calcium content at the time of labour was lower than that of normal non-pregnant women. Widdows⁶ reported that in normal cases a small but definite drop in the blood calcium occurred during the last months of pregnancy, whereas in several pathological states complicating pregnancy this fall was not observed. For instance, cases of eclampsia and pre-eclampsia presented

a continuous high level of blood calcium throughout pregnancy with no decrease during the later months. There was, however, a considerable decrease immediately after confinement, followed by a slow rise during the early postpartum period. Cases with a history of miscarriages, still births, or premature labours also failed to show the decline in serum calcium which she found to be characteristic of normal cases. With excessive vomiting a high calcium level persisted throughout pregnancy with the exception of the last month, when a slight decrease occurred. In patients with albuminuria the blood calcium was below normal during the course of the pregnancy. Krebs and Briggs⁷ also have reported low serum calcium values during the later stages of pregnancy. Harding⁸ believes that a slight decrease of the serum calcium occurs during pregnancy. Fones would relate the deterioration of tooth structure during pregnancy to calcium deficiency.

On the other hand, Jansen⁹ states that, in his opinion, the serum calcium remains constant throughout pregnancy. Likewise, Dennis and King¹⁰ subscribe to the same view. However, as pointed out in their paper, the latter observers did not follow their individual patients through the different stages of pregnancy in so far as the blood calcium is concerned. Underhill and Dimick¹¹ conclude from their observations that pregnant women show a higher concentration of blood calcium than non-pregnant women and that little variation occurs during the course of pregnancy. Bell and Hicks¹² found the serum calcium to be high just prior to labour, a finding corroborated by Widdows.⁶

Judging from the above review, while there is no unanimity of opinion concerning the changes which take place in the blood calcium during gestation, the majority of investigators who have studied the problem seem to agree that there is a diminution of the serum calcium during the latter period of pregnancy. In an attempt to substantiate the validity of this more or less generally accepted view a number

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of patients were studied by estimating the serum calcium at different times during the course of pregnancy. The observations in the individual cases were begun as early in pregnancy as possible. Blood samples were collected under uniform conditions. The estimations of calcium were carried out by the micro-analytical method of Kramer and Tisdall,¹³ making use of the constant temperature device described by Watson¹⁴ as an aid in the titrations which form an essential part of the technique.

The series of 43 patients reported upon here comprised 19 normal pregnant women, 11 with albuminuria of pregnancy, 1 pre-eclamptic and

12 with histories of miscarriages. The findings in each of these groups will be presented separately.

A. NORMAL CASES

These were patients who had not had albuminuria during the pregnancy under investigation, had had no miscarriages, and had not shown signs of eclampsia or of the pre-eclamptic state. Reference to Table I shows that the serum calcium in this group tended to decrease as the course of the pregnancy advances. Judging from the few instances in which the blood samples were obtained early in pregnancy the fall in the

TABLE I

Case	Age	Para	Blood Calcium—mg. per 100 c.c. serum									
			Months									
			4th	5th	6th	7th	8th	9a	9b	pp	Days	
PRIMIPARÆ												
E.B.....	21						11.4	10.2	12.2	10.6	6	
N.H.....	22								11.4	11.0	5	
L.G.....	22			10.8	10.6	11.2	11.0			10.4	13	
M.J.....	21						10.8	10.7				
M.M.....	18						10.8	9.8				
M.T.....	27							11.4	11.0	9.4	12	
MULTIPARÆ												
A.R.....	24	3							{11.8 11.4}	10.8	6	
L.S.....	23	4		11.0	10.6	10.8	10.4					
M.H.....	22	2						11.8	10.6		5	
O.P.....	22	2					11.6	11.2		10.8	8	
D.J.....	25	3			11.8	11.3		10.6				
M.F.....	23	4	{11.6 11.2}	11.6		11.5	10.8	10.3	10.5			
D.E.....	23	3						9.8		9.8	9	
M.K.....	19	2						11.6	9.8	10.5	8	
M.L.....	28	5					11.0					
M.G.....	28	2				10.4	10.7	11.0	10.6	10.4	10	
A.M.....	26	5							11.6	9.8	14	
M.S.....	36	3				10.8		11.0	10.8	10.8	8	
M.S.....	37	2		10.6	9.9	10.0			10.4	10.2	7	

N.B.—The “a” and “b” sections of the “9” represent the first and second halves of the month. “pp” is interpreted “post partum.”

calcium level would seem to begin at about the fifth or sixth months, subsequent diminution continuing until term. The majority of specimens obtained from 5 to 14 days post-partum showed a further decrease; only one of the 12 normal cases showed an increase during this

serum calcium during the puerperium; 2 showed a slight drop while 1 remained unaltered.

2. *Pre-eclampsia*.—Only one case of this abnormality was studied. The findings are shown in Table III. The patient showed considerable variation of the serum calcium during the pre-

TABLE II

CASES SHOWING ALBUMIN DURING THE LATTER MONTHS OF PREGNANCY

Case	Age	Para	Blood Calcium—mg. per 100 c.c. serum							
			Months							
			5th	6th	7th	8th	9a	9b	pp	Days
J.P.....	39	5						8.9	10.2	5
E.T.....	34	7						11.8	13.4	6
E.W.....	30	3						10.6	10.4	5
P.G.....	38	2						11.6	11.9	10
M.L.....	23	3			11.0	{ 9.7 11.2 }				
M.O.....	20	2	10.8		10.9	12.0				
M.Og.....	30	3						10.4	10.4	10
M.G.....	29	4	11.2	10.8	11.4	10.0	11.5	10.9	10.5	7
M.L.....	35	7	12.0			10.4	10.8	10.6		
M.W.....	19	1					11.2	9.2	10.8	10
M.H.....	30	4		10.8		8.4	9.8		11.6	12

period. Multiparæ did not appear to show so marked a variation in the blood calcium as primiparæ. In the former, the serum calcium was more stable, presenting but slight fluctuation during the prenatal period with a tendency to remain at a constant fixed level.

B. ABNORMAL CASES

1. *Albuminuria* during the later months of pregnancy. Table II shows greater variations occurring in this group than in cases of normal pregnancy. Five of 8 cases showed a rise in

natal period, decreasing just before term and continuing to decrease during the puerperium.

3. *Miscarriage* cases.—The majority of cases in this group showed a fall in the blood calcium level as in the normal cases. (See Table IV).

SUMMARY AND CONCLUSIONS

1. The blood calcium does not remain constant during normal pregnancy and the puerperium.

2. Generally speaking, there is a decrease of the serum calcium during the latter months of pregnancy, especially marked in young primi-

TABLE III

ONE PRE-ECLAMPTIC CASE

Case	Age	Para	Blood Calcium—mg. per 100 c.c. serum							
			Months							
			5th	6th	7th	8th	9a	9b	pp	Days
M.G.....	20	1	12.2	10.8	12.4		11.5	9.8	9.3	12

TABLE IV
MISCARRIAGE CASES

Case	Age	Para	Mis- carriages	Blood Calcium—mg. per 100 c.c. serum									
				Months									
				4th	5th	6th	7th	8th	9a	9b	pp	Days	
M.L. . . .	35	7	2		12.0			10.4	10.8	10.6			
E.T.	34	7	2							11.8	13.4	7	
M.W.	38	6	1	12.4			10.6	{11.7} {10.8}		11.0	10.0	8	
M.C.	20	3	1					{11.4} {10.2}		9.7	11.5	8	
M.L.	24	5	1	12.0	12.0	10.8	9.6						
M.L.	23	3	1				11.0	{ 9.7} {11.2}					
M.B.	33	9	1					10.0	10.8		10.4	12	
M.S.	30	4	1				10.8	10.8		10.8			
M.B.	27	5	1				12.8			11.0	10.8	8	
M.M.C. . .	29	7	1					13.2		9.7			
M.W.	30	3	1							10.6	10.4	5	
M.S.	40	14	1			12.0		11.4					

paræ. This is followed by a still further decrease early in the puerperium.

3. Cases complicated by various abnormalities during pregnancy frequently fail to exhibit the above-mentioned changes.

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THE ULTRAVIRUS OF TUBERCULOSIS.—G. W. Schmidt (*Zeit. f. Hyg. u. Infektionskrankh.*, November 1, 1931, p. 90) has carried out a painstaking inquiry in an endeavour to confirm the findings of French and Italian workers with regard to the possible existence of a filterable stage in the development of the tubercle bacillus. Preliminary experiments demonstrated a number of fallacies inherent in the use of the ordinary earthenware bacterial filters. When precautions were taken to avoid these, it was still found that isolated organisms in the test cultures of *B. prodigiosus* could pass through Chamberland L1 candles. Inoculation of guinea-pigs with very small doses of virulent tubercle

bacilli sometimes resulted in the production of a disease similar to that ascribed to the ultravirus—namely, minimal glandular enlargement without any tubercle formation; passage experiments from such animals resulted in the production of typical tuberculosis. Schmidt's failure to demonstrate the presence of an ultravirus in filtrates leads him to suggest that the lesions ascribed to the ultravirus are in reality due to the presence in filtered cultures and tuberculous products of extremely small numbers of tubercle bacilli; he concludes that no satisfactory evidence has yet been brought forward to prove the existence of the ultravirus.—Abs. in *Brit. M. J.*

THE SURGICAL TREATMENT OF CANCER OF THE STOMACH

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THE average surgical statistics regarding cancer of the stomach demonstrate clearly that this is a very disappointing subject. There are several reasons for this. First, the cases usually come late; secondly, few general surgeons have sufficient experience or are adequately trained to tackle a complicated resection of the stomach; and, thirdly, the very promising results of effective radical surgery are not generally appreciated. How often a few enlarged glands about the left gastric artery will deter a surgeon from resecting the stomach and glands because he feels the condition has gone beyond surgical intervention, and, yet, how often would those glands show nothing but inflammatory change on histological examination. The majority of such enlarged glands are inflammatory, not malignant, and are due to ulceration of the tumour, not to its extension along the lymphatics. These enlarged glands are not a contraindication to radical surgery.

It is very evident that too much emphasis cannot be laid on early diagnosis, and the responsibility for this must be to a great extent with the surgical teachers in our medical schools. The following paragraph taken from a well known textbook on surgical diagnosis will illustrate this point.

When a patient at or past middle life complains of pain in the epigastrium soon after taking food, with frequent vomiting, and rapidly progressing debility and wasting, and, on examination, a firm, slightly tender lump is felt in the region of the stomach, and the vomitus is found to contain small amounts of blood, and a test meal shows a diminution of free hydrochloric acid and the presence of Oppler-Boas bacilli, the case is one of cancer of the stomach.

So long as doctors wait for this classical picture of cancer of the stomach to appear before they can make a diagnosis, so long will eighty per cent of such cases be inoperable when they first reach the surgeon. The primary cancer starts as an insignificant group of cells which have taken on abnormal growth, and appear first, most probably, as a small, adenomatous, growth

causing no symptoms. Cancers of the stomach which originate in an ulcer give a different history. If the gradual growth of this primary symptomless tumour be visualized as it gets larger and larger, finally becoming a large, ulcerated mass, a truer picture of the development of the symptoms of gastric cancer will be obtainable.

Cancer of the stomach usually begins in persons over 40 years of age, who have been previously free from symptoms. The onset of symptoms is so insidious that the patient ignores them. The public connect cancer with pain, for the friends they see dying of cancer complain mostly of pain. Late cancer is usually exceedingly painful, early cancer never. The first symptoms are usually what might be termed changes in the stomach habit; slight changes in appetite, perhaps distaste for some food previously well tolerated, a little heaviness after meals, perhaps some discomfort, or a slight feeling of fullness, later a little pain. Such symptoms in an adult who has been previously well call for a thorough x-ray investigation and gastric analysis. Occult blood will appear in the stool if, and only if, the cancer has commenced to ulcerate.

While it is beyond the scope of the present article to describe the x-ray investigation, in these cases one important point is usually overlooked. In an ulcer, where there is always inflammatory destruction of the mucous membrane, the rugæ of the stomach radiate towards the ulcer. In primary adeno-carcinoma, even when early, the mucous membrane tends to be stretched over the growing tumour and so the rugæ may be obliterated. These rugæ can be clearly visualized and photographed if the early barium meal is withheld and the patient given only a spoonful of barium at the beginning of the examination when local pressure is made over the epigastrium. This spreads over the stomach in a thin layer marking out the rugæ. Absence of the rugæ in a localized area is strongly suggestive of cancer of the stomach. Rugæ radiating

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to a point signify ulcer. The diffuse scirrhus cancer and the malignant ulcer frequently cannot be demonstrated by these means.

As the tumour grows, cutting off its own unorganized blood supply, necrosis occurs and symptoms develop more rapidly. Pain, dyspepsia, anorexia, nausea, vomiting, loss of weight, strength, and colour, emaciation, sooner or later make their appearance, usually months after the first vague symptoms. These symptoms must be regarded as due to sloughing, and an effort must be made to diagnose cancer before they are marked. Cancer itself probably does not produce cachexia, unless very widespread; it is the necrosis of the cancer which produces this. Therefore, a thorough investigation of stomach symptoms in elderly people should be made no matter how vague they appear to be. The presence of a tumour in the epigastrium is always a very late sign. A middle-aged person should never be treated for dyspepsia without first ruling out cancer. Early diagnosis is life saving. Patient and physician must cooperate to eliminate the deadly delay between the onset of symptoms and the final diagnosis.

The question of early diagnosis usually does not rest with the surgeon. He must take these cases as he gets them. The majority of cases continue to come late and his duty lies in curing the highest possible number by surgical means. The limits of gastric surgery as at present practiced must be widened. Too many surgeons feel relieved when they decide that on account of fixation, or glandular involvement, the cancer is inoperable and they are not called upon to do a difficult, and dangerous, radical resection. Any fixation to adjacent organs or involvement of the neighbouring glands is usually accepted as a contra-indication to resection, and the patient is condemned to death, a slow, lingering death, with much pain and suffering.

Resection is the only effectual treatment for carcinoma of the stomach. It is very important, therefore, that all members of the medical profession appreciate what results can be obtained by radical surgery. There is no doubt that surgery can do more than it has been allowed to do in the past. This applies to tumours of the large bowel just as much as to tumours of the stomach. Nine years ago Professor Wilkie, of Edinburgh, excised a cancer of the sigmoid which he thought to be fixed only to the uterus. The operation proved to be more extensive than he had realized so that resection of half of the

large bowel, of two loops of small intestine, and of the uterus, left tube and ovary was necessary. The patient remains well and free from recurrence to-day.

Grey Turner, in his interesting monograph "Some Encouragements in Cancer Surgery," records similar successful results. He confesses that stomach cancer surgery is most difficult because of the close association of its lymphatic drainage area with the pancreas and large blood vessels. He points out, however, that some very large tumours can be removed with very beneficial results. One such patient with a huge cancer of the stomach remained free from symptoms following resection for eight years when liver metastases made their appearance.

Finsterer reports that, though his operative mortality is high where he has to resect liver, pancreas or large bowel together with the stomach, his percentage of five year cures among his discharged cases is about as high as it is in the cases which require only a simple resection. A very great encouragement in the operative results for cancer of the stomach is the fact that, even when the lymphatic spread cannot be completely removed, the cachexia goes, the unpleasant gastric symptoms disappear, and the patient lives much longer, and in comfort. The local, ulcerating tumour is gone and with it the pain, vomiting, cachexia, and, later, as a rule, the marked secondary anæmia.

While most surgeons only resect the stomach in about 25 per cent of the cases of gastric cancer which they see, Finsterer resects in 65 per cent. He states "Without resection every patient will die and die in pain and misery; therefore, I must resect whenever possible." Wilkie writes "The policy which I adopt is to resect when in doubt, as the improvement following radical resection, even should a recurrence follow later, far transcends the benefit from any short circuiting operation." In Finsterer's series of 518 cases 329 were resected, including 8 total extirpations; 84 had gastro-enterostomies; and 97 had laparotomies with jejunostomies. A review of the end-results of these 329 resected cases is of great interest as it shows how much can be accomplished by radical surgery. Finsterer's mortality for resection in those cases in which the liver, pancreas, and transverse colon are not involved is 6.1 per cent. In 129 cases Finsterer was compelled to do a complicated resection, with the removal of part of the colon, pancreas, or liver. In these cases his mortality was 41 per cent.

This is a high mortality, but all would have been dead in a few months and, therefore, it is essential for surgeons to attempt resection in such cases. At present in most clinics these are considered inoperable. With death as the alternative, 41 per cent mortality is not a contra-indication. Age is not a contra-indication, if the correct anaesthesia and technique be used. Table I shows Finsterer's mortality in age groups. It is remarkable that the patients whose ages range from 70 to 78 years show practically the same mortality as the younger groups. This he ascribes to the use of local anaesthesia which he uses in all cases. He uses splanchnic anaesthesia, the technique of which he has done so much to perfect. When the patient is nervous, or when the operation is unduly prolonged, nitrous oxide and oxygen may also be used. By these means Finsterer has eliminated postoperative shock as a cause of death in his series.

changed their doctors on account of recurrence of symptoms.

In this table it will be seen that the percentage of discharged patients who live for five years or over after a complicated resection is almost the same as for a simple resection, that is, almost one in three. Even this high percentage includes the patients who were untraced (17) and those who died from some intercurrent affection (12). If these be excluded, as they are so frequently in statistics, it means that 37 per cent of cases who survive the operation will live for five years or more.

While it is not intended to discuss to any great extent the technical details of the various procedures used, some of the more important points must be briefly mentioned.

The first is the question of anaesthesia. There can be no doubt that operative mortality can be lessened by the routine use of local or of spinal

TABLE I
MORTALITY AFTER RESECTION

	Under 60 years		60-69 years		70-78 years		Total	
	No.	Mortality	No.	Mortality	No.	Mortality	No.	Mortality
I.—Simple resection	139	8 = 5.7%	58	4 = 6.8%	14	1 = 7.1%	211	13 = 6.1%
II.—Complicated resection	85	36 = 42.3%	37	15 = 40.0%	7	2 = 28.5%	129	53 = 41.0%

It is a great accomplishment that among the 14 patients between the ages of 70 and 78 only one died, an operative mortality of 7 per cent. Among Finsterer's material 199 cases were operated upon previous to 1925 or more than five years ago. Table II shows the results obtained in this group. It is very important in follow-up work to trace a high percentage of the patients. Where a large percentage are untraced the figures are useless, as they may include many of the failures, both of death and of patients who have

anaesthesia. Ether anaesthesia certainly increases surgical shock. After a long ether anaesthesia the urine always shows albumin. This is because of damage to the kidney parenchyma caused by the general narcosis. In those cases where prolonged cachexia and secondary anaemia have already severely changed the parenchymatous organs, especially the liver, the added damage of a general anaesthetic may just be sufficient to turn the end-result into a death. These patients do not die on the operating table, but, as Finsterer

TABLE II
LATE RESULTS (OVER 5 YEARS FREE FROM RECURRENCE)

	Operation results			Late results					
	No.	Died	Recovered	Died from intercurrent disease	Not traced	Died from recurrence	5-18 years free from recurrence		
							No.	Resected cases	Percentage of discharged cases
I.—Simple resection	124	8	116	7	10	63	36	29	31
II.—Complicated resection	75	29	46	5	7	20	14	18.6	30.4
Total	199	37	162	12	17	83	50	25.0	30.8

has frequently stressed, three or four days later from so-called post-operative shock. Local injection of half per cent novocaine with adrenalin into the abdominal wall, with a further injection of 70 c.c. of the same solution into the neighbourhood of the splanchnic nerves will produce a sufficient anaesthesia in skilled hands. The addition of gas and oxygen for nervous patients, or whenever the local anaesthesia is insufficient, will not damage the parenchymatous organs and will not produce post-operative shock. Since using this type of anaesthesia Finsterer has never lost a case from post-operative shock. It is becoming generally recognized that spinal anaesthesia will produce perfect relaxation and elimination of pain in gastric resection, and should always be used where local anaesthesia is not desired.

Another factor is the post-operative care following resection, especially in older people with any bronchial disorder. They should be made to breathe 5 per cent carbon dioxide as a routine for a few minutes every two hours. This does a great deal to ventilate the lungs and to liberate the bronchial plugs which appear to be one of the most important factors in the causation of lung atelectasis and post-operative bronchopneumonia. When this is not available it is most important to keep the patient moving, breathing deeply, and expectorating. By this latter means Finsterer has kept his lung complications at an unusually low figure for many years.

When resecting the stomach for cancer it is not sufficient to remove the stomach alone. The whole lymphatic drainage area must be carefully dissected out, even though the greater omentum, or adjacent lymphatic glands do not show gross involvement. Thus the whole of the greater and lesser omentum, with all the glands below and behind the pylorus adjoining the pancreas, and also the lymphatics in the neighbourhood of the coeliac axis must be thoroughly cleaned out. This is difficult, and requires painstaking dissection, but, when thoroughly carried out, it will result in every third patient living for five years or more without recurrence. When the tumour is fixed to the liver, pancreas, or transverse colon, so that part of these structures must also be excised, it is important always to institute drainage. When the colon, as well as part of the pancreas, requires excision Finsterer finds it is better not to do a primary anastomosis of the transverse colon. The pancreatic secretion tends

to digest the suture line and leakage is more apt to occur with peritonitis ensuing. This can be avoided by bringing the ends of the colon outside the abdominal wall, forming a colostomy which can be closed at a latter sitting. In Finsterer's hands side-to-side anastomosis of the colon has given better results than end-to-end.

Though the type of resection used will depend on the viewpoint of the individual surgeon the Finsterer modification has much to recommend it. In the Billroth I operation, where the end of the stomach is sutured to the end of the duodenum, there is danger of obstruction of the duodenum if the walls are too thoroughly inverted and continuous sutures are used. This can be avoided by using an end-to-side anastomosis between the stomach and duodenum, but here there is always the possibility of tension on the suture line. The oesophagus and the duodenum are two fixed points, so that contraction of the stomach is apt to pull on the anastomosis. In old cachectic patients suffering from carcinoma, where healing is very slow, this may lead to leakage and peritonitis. Where a large portion of the stomach has been removed it is difficult to do a Billroth I type of resection without some tension. It is wiser, therefore, to perform a Billroth II in most cases. In this operation the side of the jejunum is sutured to the end of the stomach. As the jejunum is freely movable the danger of tension on the suture line is avoided. The stump of the duodenum is closed and inverted and covered with peritoneum, utilizing the peritoneum covering the pancreas and the remnants of the duodeno-hepatic fold. The stomach, together with the greater and lesser omentum is excised, the left gastric artery being doubly ligated. The right half of the stomach stump is closed and inverted, two stay sutures being left at the left end of the closed portion. These are useful as retraction sutures, and later, when the anastomosis to the jejunum is finished, they show exactly where the fatal angle is, and that angle is then covered by two sutures which go through the anterior and posterior wall of stomach and jejunum and, in the manner of a pursestring suture, completely cover the so-called fatal angle. This modification, devised by Finsterer, absolutely prevents leaking at this angle. It further hitches up the proximal end of the jejunum in such a way that retrograde flow of stomach contents into the duodenal stump is averted. Such a flow, when it occurs, leads to

distention of the duodenum and, at times, rupture of the closed end.

When the size of the cancer does not prevent it the stomach is cut obliquely across from the left gastric artery on the lesser curvature, that is, quite near the œsophagus, to the area between the right and left gastric epiploic vessels. The whole of the lesser curvature is in this way removed, but anastomosis with the jejunum is easy, as the left part of the stomach stump is longer and can be brought into the wound.

An incision is made through the mesocolon well to the left of the middle colic artery and the left margin of the slit is sutured to the posterior wall of the stomach. The first part of the jejunum is now brought through the mesocolon. It is wise to make a line with the scalpel along the anti-mesenteric border of the jejunum as a marker. This marker prevents torsion of the jejunum when the anastomosis is being made. This is carried out just as in doing a gastro-enterostomy. When it is finished the two purse-string sutures devised by Finsterer and described above are inserted around the so called "fatal"

angle and the traction sutures cut away. A no-loop anastomosis is made so that the jejunum is sutured to the stomach as high as Treitz' ligament. The right margin of the slit in the mesocolon is now sutured to the stomach above the anastomosis so that the anastomosis finally lies below the mesocolon in the abdominal cavity.

If it is considered advisable to make the anastomosis anterior to the transverse mesocolon a long loop of jejunum should be left proximal to the anastomosis. It is then essential to suture the jejunum to the mesocolon, colon and the posterior abdominal wall to prevent leaving an opening through which small bowel might herniate. This is an occasional cause of intestinal obstruction. The mortality of the operation should not be greater than 10 per cent, even though the patient be emaciated and cachectic.

As Finsterer points out the results of resection for stomach cancer would be very satisfactory if only those cases were treated in which no lymph glands or organs were involved. The advantage would accrue only to the surgeon's

TABLE III
LATE RESULTS IN ULCER CANCER (OPERATED ON 1910-1924).

	Results of operation			Late results					
	No.	Died	Recovered	Died of intercurrent disease	Unknown	Died from recurrence	5-18 years cures		
							No.	Percentage of all cases	Percentage of recovered cases
I.—Ulcer with cancer shown only by histo- logical examination...	32	4	28	2	2	14	10	31.2	35.7
II.—Clinical ulcer with cancer diagnosed at operation on gross examination.....	28	3	25	1	3	20	1	3.5	4.0
Total.....	60	7	53	3	5	34	11	18.3	20.7

TABLE IV
LATE RESULTS IN PRIMARY CANCER (OPERATED ON 1910-1924).

	Results of operation			Late results					
	No.	Died	Recovered	Died of intercurrent disease	Untraced	Died from recurrence	5-18 years cures		
							No.	Percentage of all cases	Percentage of cases recovering from operation
I.—Simple resection.....	83	6	77	7	10	35	25	30.1	32.4
II.—Complicated resection	56	24	32	2	2	14	14	25.0	43.7
Total.....	139	30	109	9	12	49	39	28.0	35.8

statistics, however, as 75 per cent of the patients would be left to die.

A study of Finsterer's material shows a very interesting finding, namely, that gastric ulcers which have undergone malignant change show a smaller percentage of five year cures following resection than do those cases in which resection is carried out for a primary growth, even though the malignant change be so early that it can only be shown by histological examination. Thus among the 199 cases recorded in Table II, 60 had developed on the basis of a previous ulcer and 139 were primary carcinomata. Tables III and IV show the 5 to 18 year cures in these two groups. Only 20.7 per cent of the ulcer carcinoma group survived 5 years, while 35.8 per cent of the primary group were alive and free from recurrence at the end of five years.

It will be readily seen from Table III that where the malignant change occurring in an ulcer could be diagnosed grossly the permanent results were very bad, only one case living for 5 years. Finsterer has never seen a cancer of the stomach arising in the stump of the stomach left after resection for gastric ulcer, though he himself has performed several hundred resections in such cases, and has followed up his results carefully. Surely this is an important argument in favour of resection for all gastric ulcers.

Table IV shows a result among the complicated resections that is rarely appreciated by surgeons. This is, that where a complicated resection is carried out for a primary cancer 43.7 per cent of those patients who recover are alive and well from 5 to 18 years after operation, in other words, almost one patient in two. This is among a group of patients who are considered by almost all surgeons as inoperable. It is apparently true, as Finsterer believes, that the large primary growths which, growing rapidly, involve the adjacent organs are less liable to early lymphatic spread and are more amenable to radical excision. When these cases are operated upon early favourable results can be confidently expected. The mortality in these cases is high, but life without resection narrows down to a few months' misery, while the successful cases have an almost one in two chance of a 5-year cure.

Patients who have lived for over 10 years following simple resection in Finsterer's series total 20 per cent, but these figures include 33 per cent of cases who died of intercurrent disease or who were untraced. If these latter are omitted, a total of 31 per cent of these cases live

for 10 years after resection, free from recurrence. The resection must be adequate to produce these results.

SUMMARY AND DISCUSSION

It is evident, as is becoming generally recognized, that primary cancer of the stomach can be cured by resection in many cases if it can be recognized early. The diagnosis must be made before the symptoms of cancer necrosis make their appearance. These symptoms are cachexia, secondary anæmia, loss of weight, pain, persistent vomiting, and so on. Insidious changes in the patient's gastro-intestinal habits are the first symptoms of cancer and should always be watched for in elderly patients. The public must be educated to take slight gastric symptoms seriously when they come on after the age of forty. When such symptoms arise they call for special investigation by trained gastro-enterologists. No carcinoma of the stomach should be called inoperable unless nodules can be definitely palpated in the liver, the left supraclavicular gland is hard and on biopsy shows metastases, the pouch of Douglas is involved, or in the female Krukenberg tumours are present in the ovaries. These are bilateral nodular tumours in the ovary which are always secondary to carcinoma of the stomach or, occasionally, of the breast. A woman should not be operated upon for carcinoma of the stomach or even of the breast, without a pelvic examination being made to exclude the presence of metastases in the ovaries or in the pouch of Douglas. Cachexia is not a contraindication to laparotomy, as with local or spinal anæsthesia, and with delicate handling of the tissues, these patients will survive operation in the vast majority of cases. Further, cachexia is rarely due to widespread dissemination of the tumour, but to necrosis of the primary tumour. Ascites is not a definite contraindication to operation, as it may be the result of cachexia or of pressure by the tumour on the portal vein.

When resection is decided upon, it must be adequate, and must include the greater and lesser omentum and the lymphatic tissue in the neighbourhood of the celiac axis. Fixation of the stomach to liver, pancreas, or colon is not necessarily a contraindication to resection. Though these complicated resections give a high mortality (41 per cent), death is inevitable without resection, while, of those who recover 43.7 per cent live for five years or longer, free from symptoms. An ulcer which takes on

malignant degeneration metastasizes early, and, when resected, gives a smaller percentage of 5 year cures than the primary cancer.

Surgery can do a great deal more for these patients than it has done in the past if the patients can come early to experienced gastric

surgeons who have the courage of their convictions. Without operation the patients die a miserable, lingering death. With radical resection almost one in three can be saved, and the remainder will live a year or more in comparative comfort.

TOXIC HEPATITIS DUE TO CINCHOPHEN: A REPORT OF THREE CASES

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CINCHOPHEN, or atophan (chemically, 2 phenyl-quinoline 4 carboxylic acid), was first prepared by Doebner and Gieske¹ in 1887. It was introduced by Nicolaier and Dohrn² in 1908 for the treatment of gout. The tenth edition of the United States Pharmacopœia³ recognizes it as "cinchophen." It was generally considered that the drug was of low toxicity; the general practice has been to maintain saturation over long periods; Sollman⁴ gives no warning against long continued massive dosage.

However, as early as 1913 cases of skin rashes and gastrointestinal upsets resulting from the use of this drug were reported in the literature.^{5, 6} In 1922, Schroeder⁷ drew attention to the toxic effects of the drug, and published a review of 17 cases in which such effects were observed. In 1927 Reichle⁸ reviewed 47 cases collected from the literature, among which 11 had died from toxic jaundice.

Because of these toxic effects, it seems worth while to offer a discussion of some of the more common symptoms produced by this drug, and to present three cases of toxic hepatitis due to its use, one of which was fatal.

Cinchophen is a white powder having a sour and bitter taste. It is related both to the alkaloids and acids. It is acid in reaction and forms salts with the alkali metals.⁹ It has been used with excellent results in the treatment of gout and allied conditions, its action closely resembling that of the salicylates. It is also effective as an analgesic, antipyretic, and promotes the excretion of uric acid by direct action on the

kidneys. This last effect is thought to be due to an increased permeability of the kidneys to urates, so that those previously retained in the blood because of the difficulty attending their elimination by the kidney escape in the urine.⁴

The absorption of cinchophen from the stomach occurs very promptly. Its influence on the excretion of uric acid is at its maximum, about an hour after the drug has been given by mouth, the effect beginning to decline in three hours. This is temporary, however, as although the excretion of uric acid is increased during the first three days of administration of the drug it then returns to normal, or below, whether administration is continued or not. For this reason many recommend that the drug be given for periods not exceeding three days, and that it then be discontinued for at least four days. For the most part cinchophen appears to undergo decomposition in the tissues, although an unchanged portion is excreted in the urine.¹⁰ Almost every case of poisoning which has been reported was the result of uninterrupted use of the drug over long periods of time.

In medicinal doses cinchophen usually causes no symptoms whatever. In very large doses it may cause a burning in the stomach which lasts only a short time.⁹ Its toxic action is thought to be due to the presence of the quinolin nucleus, which consists of the benzene and pyridin rings.⁴ Most persons are not susceptible to the toxic action, and toxic jaundice occurs only in the presence of an individual idiosyncrasy, which may be artificially induced. For this reason a therapeutic test of the drug before its administration has been advocated.

The dosage and the duration of administration before the onset of symptoms varies with the individual case.¹¹ Cases of extreme toxicity have been reported following very small doses.¹¹ The symptoms come on abruptly, and, as a rule, appear late; frequently, they may appear some time after administration of the drug has been stopped. The amount of glycogen present in the liver is probably an important factor in the production of toxicity, there being a greater tendency to liver degeneration when the amount is small. Thus, alcoholics, pregnant women, and those who have previously suffered from liver disease associated with jaundice are more likely to suffer the toxic effects of cinchophen. The route of attack is not definitely known.^{11, 12}

The principal symptoms of toxicity are headache, gastrointestinal disturbances, and jaundice. The most frequent of these is jaundice, which has been present in almost every reported case. Vomiting, anorexia, heartburn and diarrhoea, when present, usually precede the jaundice. On the other hand, jaundice may appear first and be intense from the beginning and it may be accompanied by diarrhoea.¹³ Weakness may be noted first, and in some cases this symptom has been accompanied by emotional disturbances and loss of voice.¹⁴ Itching of the skin is a common symptom.¹⁵ As a rule the first symptoms noted are pains in the right upper quadrant and right back, and vomiting. After the patient has felt ill and tired for a few days, jaundice sets in. Severe vomiting, often of a bilious nature, may be present from the outset. Sleepiness and stupor, progressing to delirium, frequently occur, and the patients rapidly retrogress, the majority dying in coma.

The liver may at first be enlarged, but soon begins to decrease in size, until it cannot be felt. As a rule, the left lobe decreases more rapidly, and this is an important point in diagnosis. The jaundice is very rapid in its development and varies in its intensity. The spleen, although it is enlarged, can seldom be felt.

The amount of urine decreases. It is dark brown and contains traces of albumin, but no sugar. Hyaline and granular casts, red blood cells and bilirubin crystals may be found. Tyrosin may be present but is not of diagnostic significance. The total nitrogen of the urine is increased, as are also the ammonia and uric acid. The duodenal contents may or may not show bile. The patients are usually constipated;

the stools may be acholic and at other times may show bile. The blood shows a markedly increased bilirubin. The blood sugar is first increased and later decreased. The sugar tolerance is later decreased. Blood coagulation is decreased and the bleeding time increases early. The red blood cells and hæmoglobin are usually increased, although the former may be markedly decreased. The total number of white blood cells is usually increased, but leukopenia with relative lymphocytosis may occur. The temperature is variable; there is a high rise before death.

The duration of the symptoms varies with the severity of the process. It is important to remember that these cases may present symptoms of acute gall bladder disease, and there are cases on record in which an operation has been performed.¹²

Early diagnosis is important. At the first sign of toxicity the administration of the drug should be stopped, and a careful watch kept over the patient. If urticaria occurs calcium lactate may be used. For the relief of the gastrointestinal symptoms glucose should be given in large amounts, by mouth, in the form of the Murphy drip, or intravenously, if the symptoms are at all severe. When glucose is administered insulin should be given also in order to better fix the glycogen of the liver, to protect it from further damage, and so to aid in the recuperation of this organ.

The pathological picture resembles that of acute yellow atrophy. The liver is small, and the left lobe may be so atrophied as to have almost disappeared. There is almost complete necrosis of the liver cells with little or no evidence of regeneration. The bile ducts are unaffected. The kidneys are large, soft and pale. The damage is chiefly in the tubules of the cortex, and is in the nature of cloudy swelling and destruction. The glomeruli apparently escape damage, and the collecting tubules are normal. As a rule other organs are not affected, although cases have been reported in which there were present acute splenic hyperplasia,⁸ acute pancreatitis¹⁶ and petechial hæmorrhage on the mitral valves, pleura and mucous membranes of the stomach and jejunum.

During the past fourteen months three cases of toxic hepatitis due to cinchophen have been seen at the Cleveland Clinic, one of which was fatal. The case reports follow.

CASE 1

The patient, a man 45 years of age, was first seen at the Clinic on October 16, 1929. At that time he complained of pain in the left hip and back, which had been present for several months, and which was so severe as to incapacitate him. The pain had been growing worse recently, and the patient noted that it was aggravated by cold and rainy weather. At first it was worse in the evening and better in the morning, but recently he had noted stiffness in the joints on waking in the morning, with some limbering up upon motion. The family and personal history were unimportant.

Physical examination.—The patient was a very robust, rather obese man, weighing 210 pounds. The temperature was 98.6°; pulse 80; blood pressure 152/88. There was a scoliosis to the right in the lower two-thirds of the dorsal spine, and to the left in the lumbar spine. He moved with great difficulty. There was a marked restriction of movement in all directions in the lower back. There was marked tenderness over the right flank, at which point no masses could be discovered. There were no gross changes suggestive of polyarthritis. There were extensive varicosities over the right saphenous vein to a point two inches above the knee. There was extensive pyorrhea. The patient experienced discomfort on straight leg raising on both sides, particularly the right.

Examination of the nose and throat showed a deviation of the nasal septum to the left and chronic tonsillitis, indicating that the tonsils might be a focus of infection. X-ray examination revealed a marked left lumbar and lower dorsal scoliosis with rotation, with considerable hypertrophic arthritis.

At the time of this first examination the impression was gained that the patient had a hypertrophic arthritis aggravated by his activity, and that the present acute attack was due to an injury superimposed on the arthritic process. The diagnosis made included scoliosis, hypertrophic arthritis of the spine, chronic tonsillitis, and pyorrhea.

The patient was advised to rest, to apply heat to his back, to have the teeth cared for and to have tonsillectomy if no improvement resulted from these measures. On October 21st he reported that he felt much better, but on January 6th his wife reported that the symptoms had increased in severity and she was advised to bring him to the hospital.

The patient was seen on January 13th when he stated that he had been having very persistent pain in the lower back and upper spine. He had been taking cinchophen for several days, but the exact amount administered was not known. He had had some gastrointestinal disturbance, and about January 8th jaundice had developed, accompanied by considerable nausea and some pain in the right upper quadrant of the abdomen. Examination at this time showed a diffuse icterus, with a yellowish discoloration of the sclera. Movement in the lumbo-sacral region was markedly restricted and there was tenderness over the lower back. The edge of the liver was palpable and tender.

The patient was referred to the Medical Division for further investigation, and the following additional history was obtained. Six days before this visit he had had mild pain in the epigastric region, accompanied by nausea and vomiting. The skin became yellow. The urine was highly coloured and the stools were pale in colour. The pain lasted for some hours and then was relieved. The stools continued to be pale in colour. The impression at this time (January 13th) was that there was an obstruction of the common duct or catarrhal jaundice.

The patient was admitted to hospital on this date. Further examination in hospital disclosed marked jaundice, with red palms and finger tips. There were numerous telangiectases in the skin. The chest was barrel-shaped with prominence on the right side posterior-

ly and flattening on the left side. Percussion and auscultation gave normal findings. The abdomen was evenly rounded with a slightly full contour. The liver was palpable at the right costal margin and was not tender. There was some tenderness to pressure in the region of the right costal margin and also at the tip of the eighth left costal cartilage. The temperature was 99.4°; pulse 70; respiration 20; blood pressure 112/60. An x-ray examination of the gastro-intestinal tract made on January 15th disclosed a non-functioning gall bladder. The serum bilirubin on the day of admission was 16.7 mg. per 100 c.c. (see graph). Blood

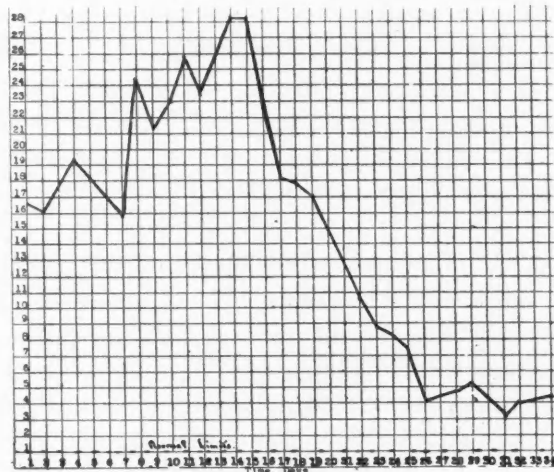


CHART I.—Curve showing serum bilirubin.

count: red cells 4,370,000; white cells 5,000; hæmoglobin 80; polymorphonuclears 72, small lymphocytes 20, large lymphocytes 8. The urine contained albumin 1+, bile 2+, and there was an occasional hyaline and granular cast.

On January 23rd the patient's condition was about the same. The jaundice was quite deep; serum bilirubin was 22.7. Some distress was present over the chest and up into the neck. The liver was palpable, regular in outline and not tender. On January 29th the patient did not feel at all well. There was a feeling of tightness across the lower chest and axillary regions, particularly on deep inspiration. X-ray examination revealed a large, dense circumscribed mass at the hilus in the posterior portion of the right lung, extending down behind the diaphragm. This mass had somewhat the appearance of a tumour, but the impression was that it was of an inflammatory nature, either from an old encapsulated empyema or an unresolved central pneumonia. Investigation of the genito-urinary tract on this date showed no evidence of disease.

On February 3rd the patient was much worse. He complained of pain across the chest and extending up into the neck. He felt weaker and was losing weight. The diastase of the urine was at the upper limit of normal. By February 11th the jaundice had almost disappeared (serum bilirubin 5.2) but pain was still present in the upper region of the spine. The liver edge was palpable, sharp and not tender.

In order to rule out the presence of malignancy an x-ray examination of the spine was made. No definite evidence of metastasis was found except in the region of the sixth dorsal vertebra, where an area of rarefaction and some compression was noted. However, this finding is not at all characteristic of malignancy. Clinical examination of the spine failed to reveal any evidence of malignancy. The temperature remained normal throughout the stay in the hospital.

When this patient was admitted to the clinic his condition was diagnosed as hypertrophic

arthritis. There was no evidence of any gastrointestinal disease, either from the history or the physical examination. It is to be noted that gastrointestinal symptoms and jaundice did not occur until about January 8th, at which time he had been using cinchophen for several days. It is to be further noted that when administration of the drug was stopped, and the patient was put on treatment, the gastrointestinal symptoms and jaundice disappeared rapidly, until at the time the patient was discharged, on February 15th, the nausea, vomiting and jaundice had completely disappeared. I believe this evidence is sufficient to class this patient as a case of toxic hepatitis due to cinchophen.

After his discharge from the hospital the patient was not seen again and letters sent in an effort to determine his subsequent progress were returned unopened.

CASE 2

The patient, a woman, 49 years of age, came to the Clinic on December 8, 1930, complaining of pain in the chest which had been present for the past ten years. The pain came in attacks and radiated up into the neck and down the right arm. It was not related to food or effort. At first the pain occurred only about once a month, but at the time the patient entered the Clinic it was occurring every few days and lasted from two to three days in the form of a dull ache. This pain had no connection with the bowels. Sick headache occurred sometimes but was not related to the pain in the chest. The attacks made the patient feel weak, but did not frighten her. The pain was accompanied by some belching of gas and some soreness in the upper right abdomen.

Family history.—The mother died of diabetes associated with gangrene. One brother died of an unknown internal disease.

Personal history.—The patient had had measles, mumps, and whooping-cough and during the entire year 1923 she had suffered from rheumatism which had cleared up before she entered the clinic. Following an accident to her right hip an abscess had developed, which was drained in 1909.

Physical examination.—The patient was a well nourished, well developed woman. The temperature was 98.2°; the pulse 88; blood pressure 120/80. Physical examination gave normal findings, except for one enlarged node in the right axilla and a little soreness in the right breast. No local tenderness was present in the right pectoral muscle, and all movements of the arm and shoulder were free. The nose and throat examination revealed a deviated nasal septum and chronic tonsillitis, indicating a possible focus of infection. The diagnosis was neuralgia of the chest and arms, chronic tonsillitis, and deviated nasal septum.

On December 22nd the patient was still complaining of distress in the right side of the chest, which she said sometimes kept her awake. There was some belching of gas. X-ray examination of the gastrointestinal tract gave normal findings. The patient was started on cinchophen, grs. 7.5, b.i.d., 30 tablets in all being administered. On January 5th she still complained of gas, which prevented her from eating much food. There was still some distress in the chest. She was given a prescription containing sodium salicylate, sodium bicarbonate, and sodium bromide, and was advised to have

her tonsils removed. On January 8th while taking a bath she noticed a decidedly jaundiced condition. She had had no cinchophen for two weeks. The clinical impression at this time was that catarrhal jaundice was present. She was given magnesium sulphate and advised to discontinue all other forms of medication. On January 17th she was seen at home. She was comfortable, her only complaint, aside from increasing jaundice, being a poor appetite. She was mentally alert. She was advised to force fluids, and to take plenty of sugar. On January 26th her husband reported that she was much worse. She seemed delirious and would not take food. This condition had begun twenty-four hours previous to her husband's report. She was brought to the hospital in a comatose condition and was delirious at times. She was markedly jaundiced. Involuntary muscle twitchings were noted. The edge of the liver was not palpable and there was an increased area of cardiac dullness. Glucose and saline were forced intravenously. Her temperature at the time of admission was 98.6°; pulse 110; blood pressure 120/75. Blood count: red cells 6,010,000, white cells 6,450, polymorphonuclears 74, small lymphocytes 24, monocytes 2. The blood urea was 27; cholesterol 176; total serum proteins 8.75; albumin 3.8; globulin 4.95.

At noon the following day the patient was catheterized and 200 c.c. of very dark-coloured urine obtained. She became restless and semicomatose. She was given glucose and saline intravenously, but her course continued to be progressively downward. The liver became quite atrophic as far as could be determined by percussion; there was almost no left lobe dullness, and the right lobe dullness appeared to be decreased by half. The urine which had to be obtained by catheter was scanty and contained bile 4+ and many bile stained casts. No tyrosin crystals were found in settled and centrifuged specimens. The patient died on January 30th. About thirty-six hours before death a great deal of pulmonary oedema developed, but there was little or no general oedema. The heart action was satisfactory at all times. The blood pressure fell gradually. Permission for an autopsy was refused.

CASE 3

This patient, a woman 31 years of age, was first seen at the Clinic on December 10, 1930. Two years previous to this time she had been operated upon for gastric ulcer, following which she had enjoyed good health until August, 1929. She then noticed a gagging sensation, with some soreness about the incision, and eructation of gas. The taking of food usually, but not always, aggravated the symptoms. Progressive fatigue developed, accompanied by pain in the joints, especially in the right shoulder, the right wrist, both knees and the sides of the neck. No swelling or redness of these joints was noticed at any time, but a creaking was constantly present. The symptoms were worse during the menstrual periods. The gastric symptoms occurred about an hour after meals; there was no nausea or vomiting, but appetite was decreasing and she was constipated.

The family history was unimportant.

Personal history.—The patient had had no serious illnesses. Two operations had been performed—a uterine suspension in 1923 and a gastroenterostomy (ulcer) in 1928.

Physical examination revealed a well nourished, well developed woman, 5 feet 7 inches in height, weighing 162 pounds. The temperature was 98°; pulse 72; blood pressure 132/88. The tonsils were large and appeared to be infected. Tenderness was present in the mid-epigastric region, but no masses could be felt. The liver and spleen were not palpated. There were suprapubic and upper right rectus scars. On passive movement of the right wrist a creaking sensation was produced. Other joints appeared normal. The nose and throat examination disclosed hypertrophied and infected tonsils, chronic catarrhal maxillary sinusitis and ethmoiditis.

Two devitalized teeth were found, and two others showed periapical absorption.

The tentative diagnosis at this time, then, included possible marginal ulcer, dental sepsis, infected tonsils, sinusitis, chronic ethmoiditis, mild chronic infectious arthritis.

An x-ray examination of the gastrointestinal tract showed the stomach and gall bladder to be functioning normally. A gastric analysis showed 23 per cent free acid, 36 per cent total acid. The patient was given an alkaline powder, and atropine sulphate, gr. 1/100 b.i.d., and was advised to have her teeth extracted. On December 22nd she was feeling better and was given a prescription for belladonna, hyoscyamus and bromide.

On January 7th she complained of stiffness in the neck, right shoulder, back and arms. She was again advised to have her teeth and tonsils removed, and was given a prescription for cinchophen, grs. 7.5 t.i.d.

On January 28th, she reported that she had had her tonsils removed two weeks before. During the previous week she had been nauseated and on the day upon which she reported to the clinic she had vomited some green fluid. On the previous day she had noted some itching of her hands and feet. She had had no cinchophen for a week, having had a total of 150 grains. On February 2nd she had been vomiting and suffering from gas and pain in the stomach. She was very sleepy. The urine was quite dark, the vomitus was yellow in colour and slimy. The patient had had several red "blisters" under her skin. Two days previously she had noted that her eyes were getting yellow.

Examination showed her to be quite jaundiced, and excoriations were noticed on the legs due to scratching. There was a small spot to the inner side of the left knee and one on the palm of the left hand. There were a few black and blue marks on the right leg, above the knee, not due to trauma. The liver was tender but not palpably enlarged. There was an area of infected granulation in the upper jaw at the site of an extracted tooth.

The impression was that of cinchophen toxæmia and infected dental granulation. The patient was given alkaline powders, a high carbohydrate diet was advised, and she was instructed to take a drachm of phosphate of soda every morning. On February 17th the jaundice had increased, and the stools were grey. The patient

was admitted to the hospital for treatment. On examination she was found to be dehydrated and deeply jaundiced; she presented a toxic appearance, but was not undernourished. The right lobe of the liver was palpable at the costal margin. The left lobe seemed definitely smaller to percussion. No tenderness was present. The spleen was not palpable. The temperature was 98.6°; pulse 85; blood pressure 105/75. The patient was vomiting and appeared to be quite ill. She improved rapidly upon administration of glucose intravenously and a high carbohydrate and low fat diet. On February 23rd the right lobe of the liver could not be palpated and both lobes appeared smaller to percussion than before. At present the patient is almost well and will be discharged from the hospital within the next few days.

The above brief review of the history and pharmacology of cinchophen, the symptoms of toxæmia resulting from the use of the drug, and the method of treatment described, prove definitely that the administration of this drug may be attended with grave danger, one of the three cases reported here having terminated fatally.

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ACUTE MONOCYTIC AND LYMPHATIC LEUKÆMIA

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THE present general conception is that two types of leukæmia exist: (a) the myelogenous, arising from the bone marrow, and (b) the lymphatic, arising from the lymphoid tissue. A third type arising from the reticulo-endothelial system and characterized hæmatologically by a very marked degree of monocytosis is not so well recognized. Reschard and Schilling-Torgau¹ in 1913 first described this new type of leukæmia. Dameshek² in an exhaustive review of the literature found 29 cases beside 2 of his own.

Less than a decade previous to 1913 all acute leukæmias were classified as lymphatic. Pinkus³

in 1905 said "The definition of acute lymphatic leukæmia comprehends all the acute cases so far known. There is no case described without prejudice which shows other than a lymphatic blood picture or manifests its principal change in any other blood-making tissue other than lymphatic." Since 1905 the tendency has been to classify most of the acute cases of leukæmia as myelogenous.

Clinically acute monocytic leukæmia differs very slightly from the other forms. The majority of cases occur in males, only two of the reported cases occurring in women. The majority occur between the ages of 30 and 50. The etiology

is unknown. Some observers feel that these cases are infectious, causing sufficient irritation of the reticulo-endothelial system to produce a marked monocytosis. This view is held particularly by Sternberg⁴ and Krahn.⁵

The onset is usually gradual with fatigue and swollen gums, but at times is acute with high fever. As a rule the disease progresses fairly rapidly after the first symptoms appear. The fever becomes sustained, the gums more swollen or ulcerated, even gangrenous. Physical examination shows a very marked degree of pallor, the gums swollen and necrotic, and, possibly, enlargement of the lymph glands. The liver is usually enlarged and the border of the spleen can usually be felt below the costal margin. Petechial spots are common and bleeding from mucous membrane is often pronounced. Disease lasts two weeks to six months, or an average of ten weeks and death occurs in coma or after repeated hæmorrhages.

There is usually a marked secondary anæmia; the hæmoglobin may be as low as 14 per cent and erythrocytes even below 1,000,000. The white blood count is almost always elevated, although an occasional case may be "aleukæmic"; the average count is 15,000 to 45,000, but may be as high as 400,000. The differential count shows marked preponderance (70 to 90 per cent) of large cells, monocytes and the probable forerunner of the monocyte, the histiocyte. The histiocyte is called "monoblast" by Merklen and Wolf,⁶ "hæmohistoblast" by Ferrata and Reitano,⁷ and "clasmato-cyte" by Sabin.⁸ Maximow⁹ called these cells "resting wandering cells" for years, but in his 1930 text-book¹⁰ he uses the term "histiocytes".

The diagnosis of monocytic leukæmia depends on the correct diagnosis of the cell known as the "monocyte", i.e., the endothelial leukocyte of Mallory¹¹; the "large mononuclear" of older authors, and the "transitional" cell of Ehrlich.¹²

CASE 1

L. P., a male, aged 35 years.

Family and personal history.—Negative.

History of illness.—On January 12, 1931, the patient complained of general malaise, weakness, pains and infected mouth. Examination at this time showed marked redness and swelling of gums, with a low grade temperature ranging from 99° to 101°. This condition continued until January 31st, when he developed marked ulceration of tongue, lip and gums.

A smear from the mouth showed Vincent's organism. Blood examination showed a secondary anæmia. In February he developed marked adenitis on the right side of the neck, dilatation of the right pupil, profuse sweating over the distribution of the spinal accessory nerve, and a few days later marked herpetic rash over this area, with clouding of the right cornea and absolute loss of sight. Five or six days later sight returned unimpaired, the rash cleared, the adenitis disappeared and the condition of gums was much improved under arsenic. There was still a number of bad infected roots of teeth and slight redness about the gum margins. During March he ran a mild temperature from 98° to 101°; no complaints except general weakness. Patient admitted to Hôtel Dieu April 7, 1931.

Physical examination.—Examination showed marked pallor, but no loss of weight. The mouth showed marked swelling of gums with a few ulcerated areas, slight enlargement of lymphatic glands of neck, and groin, a palpable liver and spleen. Smear from the mouth was negative for Vincent's organism. Examination of blood showed hæmoglobin 42 per cent; erythrocytes 1,920,000; leukocytes 19,800. Unfortunately, no differential count was done at this time.

On April 10th, the patient was transfused with 500 c.c. citrated blood. Urine: clear, acid, specific gravity 1010; albumin, a faint trace; sugar none, microscopically, a few granular casts and an occasional leukocyte.

April 11th.—Hæmoglobin 45 per cent, erythrocytes 1,900,000, leukocytes 31,000, polymorphonuclears 60, small lymphocytes 35, mononuclears 5. Blood culture was negative.

April 13th.—The patient complained of pain in the right arm, and examination showed a phlebitis extending up the veins for eight inches above the incision.

April 18th.—The patient was transfused with 500 c.c. citrated blood.

April 21st.—Blood examination showed hæmoglobin 45 per cent; red blood cells 2,120,000; leukocytes 81,000; polymorphonuclears 15, small lymphocytes 35, mononuclears 50 per cent.

From April 21st to May 1st his condition was stationary.

On May 1st three teeth were extracted. The next day the face was much swollen, sockets were bleeding, the gums very bluish and the odour very offensive. Numerous petechial hæmorrhages were noted under the skin over various parts of the body.

May 4th.—The patient was markedly prostrated; pulse irregular; gums very bluish, an odour as of necrosis; later in the day the patient was semi-conscious.

May 5th.—Hæmoglobin 40 per cent; red blood cells 1,500,000; white blood cells 380,000, polymorphonuclears 3 per cent; small lymphocytes 15 per cent, mononuclears 82 per cent. The patient became comatose and died.

The right pleura showed a number of old adhesions over the upper lobe; left pleura, normal. Both lungs showed hypostatic congestion. The glands about the hilus were enlarged to about the size of small Lima beans.

The liver was markedly enlarged, weighing 3,240 g., and appeared congested. The spleen was enlarged, weighing 300 g. The stomach was distended and filled with gas. The intestines were normal. The pancreas was normal. The left kidney was enlarged and pale, with a solitary cyst; the right kidney was enlarged and pale. The bladder and prostate were normal. The glands of the mesentery were enlarged to about the size of a pea, while the deep glands along the vessels were enlarged to the size of small Lima beans. Section of the liver showed marked infiltration with large mononuclear cells, especially about the blood vessels and ducts. The spleen showed marked infiltration with large mononuclear cells.

Diagnosis.—Monocytic leukæmia.

CASE 2

J. S., a male, aged 33 years.

Family and personal history.—Negative.

History of illness.—For the past two months he had had a sore mouth with slight bleeding from the gums, general malaise and weakness. He had lost 15 lbs. in weight. Admitted to Metropolitan General Hospital April 27, 1931.

Physical examination showed marked pallor, infection about the teeth with some bleeding. Blood pressure 110/64. Temperature 98° to 100.3°. Lungs negative; heart negative. Abdomen negative; nervous system negative; urinalysis negative. Hæmoglobin 42 per cent; red cells 2,260,000; leukocytes 7,400, (polymorphonuclears 56 per cent, small lymphocytes 44 per cent; 4-5 per cent normoblasts). At the patient's request he was discharged May 13, 1931.

He was admitted to Grace Hospital, June 3, 1931, very weak, with extreme pallor, marked infection and hæmorrhage from the gums; the glands of the neck, groin and axilla were palpable. The liver was slightly enlarged and the spleen barely palpable. Examination of blood, hæmoglobin 20 per cent, red blood cells 870,000, white blood cells 12,000, polymorphonuclears 22 per cent, small lymphocytes 14 per cent, mononuclears 64 per cent.

At the patient's request he was discharged June 6, 1931.

Diagnosis.—Monocytic leukæmia.

CASE 3

Miss E. L., aged 44 years.

Family history.—Not relevant.

Previous history.—Whooping cough twice; measles as child; otherwise she had been in good health until the onset of the present illness.

Present illness.—In good health until October, 1929, when she felt miserable, and tired, and short of breath. She was in Harper Hospital, Detroit, and received two transfusions in November, 1929. Her condition improved after this and she returned home on December 1, 1929. On January 1, 1930, she developed herpes zoster and was confined to bed for several weeks. March and April showed a gradual decline in strength. April 7, 1930, red blood cells 1,200,000; white blood cells 2,000; hæmoglobin 30 to 35 per cent.

May 2, 1930.—The patient was admitted to Thomas Henry Simpson Memorial Institute for Medical Research at Ann Arbor, Michigan. The report at that time showed a well nourished patient with very definite pallor; no abnormalities of heart, lungs or abdomen; liver and spleen not palpable; no glandular enlargement and no oedema. Various blood examinations showed hæmoglobin (Sahli) 45 to 48 per cent; red blood cells 2,560,000 to 2,380,000; white blood cells 5,700 to 4,350. Differential count, polymorphonuclears 20 per cent, polymorphonuclears young 8 per cent, meta-myelocytes 1 per cent, myeloblasts 30 per cent, eosinophiles 4 per cent, basophiles 0.5 per cent, large lymphocytes 3.5 per cent, small lymphocytes 8 per cent; mononuclears 0.5 per cent; mast cells 24.5 per cent. Gastric analysis, no free HCl. After transfusion and rest in hospital the patient gained weight and felt better. June, 1930, she felt very miserable, being tired and very short of breath. During this period repeated blood examinations showed hæmoglobin 40 to 28 per cent, red blood cells 1,760,000 to 1,300,000; white blood cells 6,000 to 2,600, (polymorphonuclears 40 to 45 per cent, small lymphocytes and immature myeloblasts or lymphoblasts).

July, 1930.—She was in the Mayo Clinic for observation and treatment, and received six transfusions. Discharged on September 23, 1930; blood count hæmoglobin 69 per cent, red blood cells 4,090,000, white blood cells 10,200, immature white blood cells 30 per cent. The patient felt much improved. During next few weeks

she gradually lost ground until October 11, 1930, when she was admitted to Metropolitan General Hospital for transfusion. Examination at this time showed a well nourished female with no abnormality of heart, lungs or abdomen. Blood examination, hæmoglobin 50 per cent, red blood cells 2,480,000, white blood cells 4,500, (polymorphonuclears 18 per cent, lymphocytes and lymphoblasts 82 per cent). During October and November she received five transfusions, with red blood counts varying from 1,600,000 to 2,700,000, white blood cells 5,400 to 11,800, (polymorphonuclears 4 to 18 per cent, small lymphocytes 81 to 96 per cent).

On December 28, 1930, she was admitted to the Metropolitan General Hospital, complaining of severe pain about the epigastrium, shortness of breath, weakness, nausea and vomiting. The gallbladder was tender on pressure. January 4th, less tenderness over the gallbladder; pulse irregular; a loud murmur at the base of the heart; a small ulcer on the left side of the tongue.

January 9th.—The electrocardiogram showed biphasic T wave in lead 1 with slurring of R-T in lead 1. This along with the history suggested coronary thrombosis.

January 14th.—The upper lip was thickened; swelling of lower jaw; small ulcers on tongue.

January 20th.—Infection of the chin, later under left arm.

January 27th.—Oedema of the throat, both posterior pillars being swollen. During January blood examinations varied: hæmoglobin 46 to 50 per cent; red blood cells 1,900,000 to 2,900,000; white blood cells 6,600 to 17,600, (polymorphonuclears 2 to 5 per cent, small lymphocytes 95 to 98 per cent, about 30 per cent of which were immature).

February 3rd.—A slough in the infected area of left axilla. The throat was still swollen.

February 7th.—An ulcer found on the inside of the left cheek and on the left side of the tongue.

February 23rd.—She developed severe diarrhoea and died.

Diagnosis.—Aleukæmic leukæmia.

CASE 4

C. L., male, aged 36 years.

Family history.—Negative.

Previous illnesses.—Typhoid fever at age of 16 years. Appendectomy, 1912.

Present illness.—He developed sore throat in January, 1931, with some infection about the teeth (Vincent's angina), weak and tired.

Present complaint.—Sore throat and mouth, weakness, general malaise, dizziness and shortness of breath on exertion.

He was admitted to Metropolitan General Hospital on April 17, 1931, for observation and transfusion.

Physical examination.—Examination showed marked pallor, slight enlargement of glands of neck, axilla and groin. The tonsils were markedly enlarged, causing considerable difficulty in breathing. The edge of the liver was palpable; spleen about 2 inches below costal margin; gums swollen and bleeding slightly. Blood examination: hæmoglobin 42 per cent; red blood cells, 2,000,000; white blood cells, 18,000, (polymorphonuclears 3 per cent, lymphocytes 97 per cent). Transfusion on the same day.

The patient was allowed to go home on April 20, 1931, but very rapidly lost weight and strength. He was readmitted on April 27, 1931. Blood examination: hæmoglobin 32 per cent, red blood cells 2,360,000; white blood cells 80,000, (polymorphonuclears 2 per cent, small lymphocytes 86 per cent, eosinophilic myelocytes 1 per cent, basophilic myelocytes 1 per cent; normoblasts 10 per cent). There was marked difficulty in breathing; heart rapid (120). The patient gradually passed into coma and died on April 29, 1931.

Diagnosis.—Lymphatic leukæmia.

CASE 5

J. S., aged 12 years.

Family history.—Negative.

Previous illnesses.—Mumps and measles, otherwise negative.

Present condition.—For three days felt tired before consulting a doctor. May 14, 1931, examination failed to show anything except a rise of temperature to 102° and slightly enlarged glands in the neck.

May 16, 1931.—Examination showed swollen, ulcerated gums, the glands of the neck, axilla and groin palpable; spleen two fingers' breadth below costal margin; the liver palpable; temperature 104°; a small hæmorrhage under the skin of the left shin. Blood examination: hæmoglobin 45 per cent, red blood cells 2,300,000, white blood cells, 140,000, (polymorphonuclears 0.5 per cent, small lymphocytes 99.5 per cent).

May 17th.—Condition worse. The patient was very restless, and vomitus has the odour of acetone.

May 19, 1931, passed into coma and died.

Diagnosis.—Lymphatic leukæmia.

REMARKS

There are two schools, the monophyletic, or unitarian, represented by Maximow and his followers, and the polyphyletic, represented by Schilling, Ferrata and their school. Maximow and Bloom¹⁰ state "The study of the embryonic development of the blood and various types of connective tissue shows that no matter how different they may look they all arise from the same embryonic connective tissue, the mesenchyme." Myeloid elements of the bone-marrow develop through proliferation and differentiation from a basophile stem cell—the hæmocytoblast; on the other hand the small lymphocytes develop from young forms of larger size which have a varying aspect. Among them the large lymphocytes have exactly the same structure as the hæmocytoblasts in the bone marrow. If they are identical, then all blood elements of the adult originate from one common stem-cell, which may appropriately be called the "hæmocytoblast." This is the basis of the so-called unitarian or monophyletic theory of hæmopoiesis. Maximow states that recent experimental investigation has shown that the different reactions of the stem-cells in various diseases (lymphatic and myeloid leukæmia) is probably not due to fundamental differences between the two tissues and their elements, but to differences in the stimuli in the respective diseases.

Schilling, in Germany, Ferrata,⁷ in Italy, Merklen and Wolf,⁶ in France, and Kiyono, in Japan, are the chief exponents of the polyphyletic, or trinitarian, school. They claim that there is a differentiation in the embryo of three

types of blood-forming tissue—myeloid, lymphatic and reticulo-endothelial. In other words there can be no transitions between monocytes and lymphocytes, and that monocytes and lymphocytes can always be separated easily.

It is on the basis that the monocyte is derived directly from the histiocytes composing the reticulo-endothelial system that the conception of monocytic leukæmia as a third type of leukæmia exists. Even Maximow (1930) agrees that there are these three types of white blood cells: (1) small cells about the size of the erythrocyte, with scanty clear homogenous protoplasm and a faintly outlined, relatively large, round nucleus (lymphocytes); (2) slightly larger cells with an oval or indented nucleus and somewhat greater cytoplasm (monocytes); (3) large cells with a protoplasm filled with fine granules and a lobulated nucleus (neutrophile granular leucocyte). Therefore it is quite conceivable to have three types of leukæmia.

Histologically, the monocyte closely resembles the histiocyte. Culturally, they are both actively phagocytic. The connective tissue everywhere contains, besides active wandering cells, non-motile elements which are able to phagocytose particular matter and to store foreign substances brought to it in colloidal solution, that is, we have both *resting* and *active* histiocytes. The monocytes are formed directly from them by proliferation in the spleen, liver, bone-marrow and lymph-nodes. The monocytes may then be classified as a connecting link between the blood and the living tissues.

Schilling-Torgau¹ states there is no doubt a third leukæmia, just as there are three types of white blood cells. Ferrata and Reitano⁷ express a belief that there is a monocytic leukæmia. Rosenthal¹³ strongly favours a third type of leukæmia; Bingel¹⁴ believes that if these cases were seen more frequently the existence of a third leukæmia would be proved. Komiya and Hayishi¹⁵ conclude that there is a third type of leukæmia. Krahn,⁵ in an analysis of monocytic leukæmia, or reticulo-endotheliosis, came to the conclusion that monocytic leukæmia is merely a reaction to infection. Other leukæmias show infection and if this idea is upheld then we must change our entire conception of the leukæmias. Naegeli,¹⁶ in the last edition of his text-book,

states that "so-called monocytic leukæmia is a temporary variant of myelogenous leukæmia into which it passes if death does not supervene. Piney¹⁷ says that "Evidence seems to be all in favour of the conception of monocytic leukæmia belonging to the group of myelosis and not being of a special form of leucosis (leukæmia) depending upon proliferation of the cells of a third hæmatopoetic system." Ordway and Gorham¹⁸ describe acute monocytic leukæmia as a separate entity.

CONCLUSIONS

The symptom-complex is practically the same in all five cases, but from a hæmatological standpoint they are divided into monocytic leukæmia (Cases 1 and 2), aleukemic lymphatic leukæmia (Case 3), and lymphatic leukæmia (Cases 4 and 5).

In Case 1 and 4 transfusions were given with rather disastrous results. After each transfusion the red blood cells remained practically the same, but the white cells showed a very marked

increase and the disease became more virulent. In the aleukemic case the transfusions tended to produce a more chronic condition and life was prolonged.

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RECTAL ETHER ANALGESIA IN CHILDBIRTH*

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AMONG primitive peoples childbirth is considered a natural process and hence is treated with indifference or even with brutality. At the height of the Egyptian, Greek and Roman civilization the childbearing woman was accorded definite consideration and the art of obstetrics had reached a considerable stage of development. With the advent of Christianity practical measures to facilitate childbirth were more or less replaced by prayer and faith, and the fact that childbirth was viewed as a process, the result of carnal sin, that was to be expiated by pain, militated against progress along this line. Indeed, until comparatively recent times the old indifference to the suffering of women during parturition, and the religious opposition to the employment of anæsthetics for the alleviation of the pain, constitute a peculiar chapter in medical history. The tendency has

been rather to criticize or look with indifference upon any new procedure which deviated appreciably from the time-honoured habit of dignified waiting, while the woman suffered. In modern days, however, each year witnesses quite profound attempts to relieve women's suffering at childbirth and each year sees improvements and beliefs more universal, that woman has a right to analgesia in labour. While neither patient nor surgeon would think of an appendix removal without complete relief from pain, a relief for a brief space of perhaps 15 minutes or more, does it not seem ridiculous to allow unfortunate woman to undergo the torment of the damned for hours or maybe days in labour?

Anæsthesia by the introduction of ether into the rectum was first reported from Russia by Pirogoff in 1847. However, not until 1923 was this technique successfully modified so as to offer a safe method which can be universally

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used. Gwathmey, at this time, devised a form of analgesia induced by the combined result of several drugs working together. The induction involves three or more hypodermic injections and one or more rectal instillations. In practically all cases it affords relief to the agonizing ordeal and in a goodly number of cases does offer painless childbirth.

Before beginning the treatment the obstetrician should carefully explain to the patient that her steady cooperation in trying to retain the rectal instillation will result in the relief of pain, that she will fall asleep and likely not waken until after the baby is born. Success depends considerably upon cooperation and confidence.

The technique of this rectal-ether analgesia is as follows. The perineum is prepared. If the pains are not too strong, suggesting early delivery, a cleansing S.S. enema preferably is given. When the pains are well established, coming at 5-minute intervals and the cervix is 2 or 3 fingers dilated in a primipara, or less in a multipara, the patient is given deep in the gluteal region the *first hypodermic* of morphia, gr. 1/4, or 1/6 grain to a smaller woman, dissolved in 2 c.c. of a 50 per cent solution of magnesium sulphate (obtainable in ampule). The patient is advised to try to remain quiet, cotton pledgets are placed in her ears, the eyes are covered with a towel, the room is darkened, curtains are drawn or lights subdued. Later, the window is closed—this is important to prevent retardation of the anæsthesia by air. All manipulations are gently and quietly done, any talk is in whispers; the patient, if talkative, is not answered. *The instillation* is given later, in a varying interval of 20 minutes or longer, according to the relief obtained from the morphia and magnesium sulphate. In preparation the patient is first turned on her left side with knees partly flexed and the area surrounding the anus is smeared with vaseline to assure no irritation if the instillation is expelled. The simple requisite *apparatus* consists of a 4 oz. enamel funnel, to which is attached about 20 inches of rubber tubing connected with a glass connecting-tip to a stiff French catheter, No. 22. The *ether mixture*, which can be prepared impromptu, consists of quinine hydrobromide, gr. xx, dissolved in 2 drams of alcohol, to which is added 2½ oz. of

ether, and the solution is made up to 4 oz. with liquid petrolatum or olive oil. This bottled mixture is kept warm in a dish of warm water and the cork is loosened. A glass of 2 oz. or more of warmed liquid petrolatum is also at hand. On commencing the instillation, about 1 oz. of the liquid petrolatum is poured into the funnel and just as it runs out of the catheter, the tubing is clamped or pinched off, thus expelling the air.

Method of instillation. — The vaselined, gloved right index finger is inserted into the rectum and the lubricated French catheter is followed along this for 8 inches or more, to assure its being inserted above the presenting part, otherwise, if the catheter curls up, the instillation will be expelled; this is all important. The ether is now poured into the funnel and slowly run by gravity into the rectum between pains. The tube should be clamped off during a pain with clamp or finger, and the patient is advised to try and “tighten up” on the rectum, not to press down and to breathe through her open mouth and make every effort to retain the instillation. Ordinarily, the quantity of 4 oz. is sufficient but in larger, stronger or excitable patients or when given late, where the birth is expected within 2 hours, much better results are obtained with a larger dose. When the funnel is almost empty of the ether mixture, quickly add the oz. or more of the liquid petrolatum to assure the patient's getting all the solution and to prevent entrance of air. Then clamp or squeeze the tube and with a large folded towel press strongly on the perineum to assist in the retention, especially during a strong pain; then withdraw the catheter quickly but gently. Towel pressure should be maintained for at least 10 minutes. This is one of the most important features on which the success of the analgesia depends. The intelligent cooperation of the nurse or attendant in maintaining silence and leaving the patient at rest is one of the key notes of success. After the instillation the patient is given the *second hypodermic* of 2 c.c. 50 per cent magnesium sulphate solution, the synergist, to prolong the action of the ether. The patient may be turned quietly on her back or left on the side, and she is made warm with blankets. In a half hour's time the

third hypodermic of magnesium sulphate solution, to deepen the effect, is given.

The results of the medication vary from a sedative effect to analgesia with unconsciousness and complete amnesia. While instilling, the patient may drowsily remark the taste of ether in the mouth; often, even before the whole instillation is given, she falls asleep, pain is eliminated, labour progresses, the contractions ensue, sometimes accompanied by slight murmuring or restlessness. Often she remembers nothing from the time of first instillation until she awakens in her room after the delivery is all over. Sometimes one instillation is sufficient to obtain quite wonderful relief. After instillation, relief is obtained for varying lengths of time according to the patient's nervous makeup, the progress of the labour, and the ability of the nurse. Freedom from complaints of pain may be from 3 to 6 hours ordinarily, but the instillation may be repeated if necessary at intervals of 3 hours or more, 3 to 4 or 5 times with absolute safety, the subsequent instillations containing only 10 grains of the quinine and each is accompanied by an intramuscular injection of 2 c.c. of the 50 per cent magnesium sulphate solution. The morphia, of course, is never repeated, to avoid likelihood of fetal asphyxia and this point is emphatically explained to the nurses. A vaginal or rectal examination may be done in 15 minutes or better later, to avoid stimulation of expulsion and disturbance. During the progress of the case, the nurse may examine the patient for progress, but not unnecessarily. On moving the patient on to the stretcher she should be lifted; her eyes should be protected against a strong electric light and the same quiet stillness maintained during her preparation and delivery. During parturition, the anaesthetist must be strongly cautioned that a minimum of ether by inhalation, if necessary, must be used—frequently no inhalation ether is required even for perineal repair.

After using this method of analgesia one is conscious of a certain feeling of guilt on hearing the shrieking agony of the unrelieved in the labour room. To-day women may be carried through labour with little murmuring and no shrieks. Relief of labour pain, however, is always open to two serious objections: first, endangering the safety of the mother or her

baby, and secondly, the prolonging of the labour. *With this rectal analgesia* there is absolute safety to both mother and child, but when ether inhalation is required during delivery the anaesthetist must not use much, as otherwise the baby may be born deeply anaesthetized. In uterine inertia, as is self evident, the instillation is contraindicated. In any case where labour stops, you must simply wait until it begins again, and repeat the technique when you know labour is advancing. It is seldom, however, that labour stops or is delayed by the instillation, if given at the proper time, *i.e.*, not too early. The instillation quinine does stimulate the uterine contractions. Sometimes quinine, grains v or x in capsule, may be given by mouth before the instillation or between instillations to promote contractions. *This ether-oil method* can be used in all normal cases, the same in the primipara as in the multipara, in dystocia, in induction, in toxæmias, in cardiac and nephritic cases, and in tuberculous conditions. From an economical standpoint this method does away with considerable expense; it can be used in the home with good results and does not require the services of an anaesthetist or the use of an expensive anaesthetic. It does not require more nursing or medical attendance than is necessary for the safe conduct of labour anywhere. This synergistic method is particularly adapted for the patient who has passed through difficult and painful labours before. The patient's knowledge during the antenatal period, that at the end she is assured of being relieved of pain is invaluable. She does not look ahead in fear and dread of the ordeal. Her energy is conserved both before, during, and after delivery, so that she makes a better convalescence. She not only looks but feels better, and may get out of bed earlier than the one who has not been so fortunate. The patient with her pains alleviated may be under the anaesthetic during the whole labour of many hours. There is no increase in operative deliveries, in post-partum hæmorrhage, or in the stillbirth rate; there is better relaxation and there is no interference in any way with the normal process of labour.

As to inconveniences, most of the so-called disadvantages are due to faulty technique, the commonest of which is probably the expulsion

of the instillation. This is oftenest due to failure to insert the French catheter above the presenting part; it curls up and with the advent of a pain, the retention enema is expelled. Occasionally an unexpelled preceding S.S. enema may cause expulsion and necessitate another instillation. The instillation is best given before the patient is too far advanced in labour or the os is fully dilated, before the pains are too strong and bearing down, as otherwise it is impossible to subdue the pains and difficulty is reached in the patient retaining the instillation. After instillation it is very necessary to have pressure put on the perineum for 10 or 15 minutes with a large folded towel to prevent expulsion with the pains. Sometimes the patient complains of a slight burning sensation in the anal region immediately after the rectal instillation; well vaselining the part will prevent this, but if the technique is followed no inflammation of even a mild type occurs. Only in the case of a severe colitis, a fistula, or an ischio-rectal abscess should this method not be used; an unrecognized fissure-in-ano may cause some burning pain for a few minutes; extensive hæmorrhoids without abrasions are not affected and do not contraindicate this method. Poor results, however, undoubtedly occur from attempts at modifying or entirely disregarding the simple rules of administration. Rarely, an idiosyncrasy to quinine is found accidentally, mostly when several instillations have been given, resulting in temporary impairment of sight due to retinal changes which clear up in a few weeks. In such cases the quinine should be omitted from the formula. Minor symptoms of ringing in the ears and temporary deafness such as is ordinarily resultant from quinine, is often observed. The patient in the home should be carefully watched, especially the multiparæ, as labour may advance and terminate very quickly while the patient is fast asleep. While a nurse is preferable at home, an ordinary attendant is quite satisfactory, as the patient practically never becomes noisy or troublesome. Vomiting is occasional, but not more than with any other form of anæsthesia. This method takes a little time but the very desirable results obtained will more than com-

pensate the obstetrician when the new mother voices her appreciation.

In my series of 540 private cases using this method of rectal analgesia, I have yet to see any serious ill effect. Practically all the cases were in hospital, in each of which I have had the excellent cooperation of the nursing staffs. Following is a synopsis of the cases which show the results obtainable with this rectal synergistic analgesia:

Number of cases treated	Normal	Abnormal	Ages	Primiparæ	Multiparæ	Class "A" complete analgesia and amnesia	Class "B" very considerable not complete	Class "C" little result mostly expelled
540	421	119	17-46	301	239	363 67%	166 31%	11 2%

SUMMARY

1. This rectal-ether analgesia method is simple, safe and inexpensive; it affords no danger to the mother or baby; it is more soothing and quieting than other forms of analgesia.
2. Results improve as the technique becomes more perfected—increased success comes with experience.
3. In 98 per cent of 540 analgesized cases pain was greatly alleviated—of these 67 per cent had practically no pain, while 31 per cent obtained very considerable relief but not to be graded perfect. In 2 per cent due to instillation expulsion or to labour being too far advanced, the patient obtained no relief from this method.
4. It is best used in the hospital but when a nurse or a reliable attendant is obtainable, it can be used in the home quite satisfactorily.
5. The relief to the patient's mental and physical condition during her antenatal period, at delivery and after the birth, is very great.
6. When such safe relief is obtainable, this method can be recommended for a more universal use both in hospital and in home deliveries.
7. The word of the patient after delivery is the best criterion as to its worth and the finest recommendation that can be given this method of pain relief.

THE POSSIBLE EFFECT OF HEALTH INSURANCE UPON HOSPITALS

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THE object of this paper is neither to endorse nor to decry the movement towards so-called "health insurance." It is simply to place before you certain developments affecting hospitals which have occurred elsewhere and which might be introduced here should our system of medical care undergo radical changes. On frequent occasions the possible effect of health insurance on *medical practice* has been discussed in medical gatherings, but we are just now beginning to give serious consideration to its effect on our *hospitals* and upon *hospital practice*.

As a representative of our national medical organization, I hesitate to participate in discussions on this subject, for press reports of previous references to this subject have been so inaccurate and misleading that the impression seems to have gone abroad that our medical organizations are endeavouring to influence the medical profession to jettison a time-honoured system of medicine which, despite all its shortcomings, has met the public needs exceedingly well. Yet this misunderstanding should be removed without delay; it should be clearly understood that the sole object of organized medicine in discussing this subject is to acquaint the profession with existing public opinion, with world-wide trends and with the relative merits and demerits of various systems. Those who assert that there is no public clamour for "state medicine" do not realize the profound changes appearing in western Canada,¹ the attitude of labour and of the farmer groups, and the recent endorsement of the principle of the nationalization of medicine by our Federal Liberal party. To the best of my knowledge our medical organizations are taking no partisan attitude on this question, either for or against; to do so at this stage is not their province. But they would be sadly remiss in their duty did they not endeavour to acquaint the medical profession with present-day facts and prevent it being caught unawares,

as was the profession in Great Britain a few years ago.

Since Germany opened the gates to the nationalization of medicine in 1883, this wave has overswept our western civilization, until now twenty-four of the leading countries of the world have made health insurance compulsory, and nearly as many others have voluntary systems of health insurance. In fact, it comes somewhat as a shock to health workers here to realize that Canada and the United States are just about the only important countries which have not adopted some form of nation-wide health insurance.² Actually, if we consider health insurance in its broader significance, many entering wedges are already inserted. From the viewpoint of hospitalization, we find pensioners and those suffering from war disabilities cared for by the government; psychiatric patients are hospitalized by the provinces; our western provinces have developed "union" hospitals; in Saskatchewan all tuberculosis patients are entitled to free hospital care, the government apportioning a share of the costs to the municipalities. Our federal government finances the hospital care of sick mariners from a special levy on ocean freight tonnage. Also, many of our large industries have their own hospitals and their own surgeons and often the families are cared for as well as the workmen. I mention this background of converging data to emphasize one particular point, namely, that *our hospitals are vitally concerned with the development of health insurance*. The hospitals cannot be otherwise than affected, and it is timely that the hospitals heed the situation.

HOW WILL THE HOSPITALS BE AFFECTED?

There is no uniformity in the effect of health insurance upon hospitals in other countries, but, in all probability, any scheme adopted here would include hospital care. It is so in most systems abroad, and is a *sine qua non* with the majority of the students of this question. With our experience with the Workmen's Compensation

¹A paper read before the Section of Preventive Medicine and Hygiene, Academy of Medicine, Toronto, on October 29, 1931, as part of a Symposium on Hospital Service.

in mind, it would be logical to anticipate also that the hospitals would be paid upon an approximate cost basis, although in many countries, such as Denmark and Germany, this payment is far below cost. As Sir Arthur Newsholme finds in his authoritative treatise, "This inadequate payment for hospital treatment is a general feature of the Continental experience of sick funds."³ Presumably such payments would entitle the insured patient to a standard basic accommodation and service and, should better accommodation or extras be desired, the difference in cost would be borne by the patient himself, or by his friends. Should such an arrangement come into effect, payments received by the hospitals, for most of the cheaper accommodation at least, would be assumed by some central organization rather than by the individual patient.

How might this rearrangement of the financial support affect the hospitals? We can take it for granted that if the government, or some commission, assumes the major portion of the financial support of our public hospitals, it is quite likely to demand a certain standard of service, increased clinical facilities and, if possible, decreased operating costs. Naturally a body or organization which foots the bill would feel that it should have considerable say in effecting economies or in demanding services *quid pro quo*.

COMPLETE HOSPITAL PROVISION REQUIRED

We could anticipate with reason a demand that hospital service in each community be as complete as the local situation requires. Most settled communities in Canada have quite adequate general hospital accommodation, although there are still vast gaps in the more sparsely settled areas. But in the great majority of communities, including large centres, there is a woeful lack of provision for the convalescent patient, for the chronic invalid, and for the incurable. Our accommodation for the insane is inadequate, and nobody wants to assume responsibility for the narcotic addict, the alcoholic, or the venereal case. I visit many towns in various parts of Canada where there is little or no provision made for patients suffering from communicable diseases; in fact, outside of our larger centres and a few smaller ones the isolation facilities are utterly inadequate, a situation which reflects badly on the municipal authorities

upon whom rests the responsibility to provide this accommodation.

This lack of complete provision of hospital service is the natural result of our uncoordinated system of hospital erection whereby the initiative is left to local philanthropy or enterprise. As a result of this haphazard system we sometimes find, associated with a lamentable lack of special accommodation, a surplus of tiny non-cooperating general hospitals in adjacent districts or sometimes in the same community, resulting in overlapping and duplication, a situation which is costly and fails to provide the diagnostic facilities only possible in larger hospitals. Should we ever develop a system of health insurance here, it would be a fair assumption that complete service would be demanded, in the more populous districts at least; moreover those responsible for the financial support would insist upon duplication and overhead being reduced to a minimum. Therefore it is not inconceivable, in any radical revision of our hospital system, that the extent and type of hospital accommodation for each area may be arranged along a definite preconceived and coordinated plan of development, as in certain European countries. For instance, in Sweden new construction and all enlargements must be approved by the State Medical Board which has supreme jurisdiction over all Swedish hospitals. This development, should it arise, would be of much concern to our many public hospitals, the majority of which operate under private boards, and particularly to hospitals directed by religious orders or denominations.

In keeping with the idea of complete service to insured persons, Sweden, for example, has taken the commendable step of providing hospital care for cases of chronic rheumatism, neuroses, after-effects of accidents, etc.; but what about those not insured? Institutional treatment in connection with welfare work in other insurance countries, as Sir Arthur Newsholme points out, is "hampered by the limitation of insurance funds, and not completely forthcoming on public health grounds when patients are unable to pay."³ Our own present system, with all its faults, does not neglect the indigent. Also, in France, patients can be sent to a hospital only if absolutely necessary, and patients are not admitted to a hospital except upon a doctor's certificate, countersigned by the mayor. This is dangerously time-consuming in the case of an emergency.

Moreover, the increasing emphasis which is being placed upon radiological and laboratory

diagnosis, and the economic difficulty of supplying reliable technical service in the smaller hospitals, may result in much greater cooperation and affiliation between hospitals in the future. It is quite possible, with the better transportation by land and air of today, and with some co-ordinated system of direction, that ultimately a scheme might be developed similar to the military arrangement of casualty clearing stations and base hospitals, thus enabling the small rural hospital to provide its patients when necessary with the very best in diagnostic and therapeutic care. In Australia, in the remote Queensland districts, the Australian Inland Mission operates a most valuable "aerial medical service." If the patient at the outpost cannot be removed to the central hospital, a skilled surgeon is carried by plane to the patient.

POSSIBLE EFFECT UPON PRIVATE SUPPORT

All of these possible developments would spell definite encroachment upon the prerogatives of the private boards of public-spirited citizens who now give unstintingly of their time and fortunes in the interests of our public hospitals. Would this encroachment alienate the interest and enthusiasm of the boards? If it be possible to make a comparison with the situation abroad, admitting that the hospital situations are not exactly parallel, we may logically anticipate a noticeable decline in the number of hospitals under voluntary boards and a corresponding increase in the number of civic or municipal hospitals.

In Germany, the percentage of state, or municipally controlled, hospitals has steadily risen until now 86 per cent are under public control. In Denmark and in Norway practically all hospitals are under state, county or municipal direction. In Austria, only the wealthy patronize private nursing homes; all others go to municipal hospitals. Spain has practically no private hospitals, nor have Poland, Egypt, and many of the South American countries. Holland still has a number of privately operated hospitals under the direction of religious bodies, but the majority are municipal hospitals. Switzerland is more like Canada and the United States, inasmuch as each canton has its own system. However, nearly all hospitals are under cantonal government. In Belgium and in many other countries the mutualites or societies have set up their own hospitals and sanatoria.

What effect would such evolution have upon

private philanthropy? We can judge from our present experience with municipal or civic hospitals. Although the principle is sound that hospital deficits should be borne by the many, not by the generous few, the fact remains that civic hospitals with a few exceptions, receive very few donations or private contributions. This probable decline in philanthropy would be a greater loss than perhaps is realized, for there is general agreement that private philanthropy would decrease markedly under a system of health insurance.

This possibility is causing considerable anxiety to the voluntary hospitals in Great Britain at the present time, for it is thought by many that the recent elevation in status of the County Council Hospitals, the old Poor Law Hospitals, will reduce the subscriptions to the voluntary hospitals. Already many of these voluntary hospitals, formerly almost entirely public, are preparing for the rainy day by developing pavilions for private patients.⁴

THE POSSIBLE EFFECT UPON THE TYPES OF HOSPITAL CONSTRUCTION

With the adoption of health insurance, we could anticipate the development of a new intermediate service to accommodate the majority of these insured patients, for, with the paying (or paid for) public ward patients separate from the charity patients, there would not be such a demand, in all likelihood, for exclusive accommodation; nevertheless, something better than the public ward would be required. Already we see some of our compensation boards insisting that hospitals provide special wards, really semi-private rooms, for their cases. Should health insurance, voluntary or compulsory, come, I would not hesitate to predict that much of the hospital accommodation of the future would be composed of small, well equipped wards of three or four beds, really semi-private accommodation. Moreover, the introduction of health insurance into Great Britain greatly increased hospitalization, and also many more patients are being referred to the out-patient clinics for specialist advice.⁵ Therefore the erection of new, or the conversion of old, accommodation would be an early demand upon a great many of our hospitals.

THE EFFECT UPON THE MEDICAL STAFF

What about the medical staff? Altogether apart from the effect on his private practice, the doctor would be much concerned over his hospital

relationship, for with the inevitable increase in hospitalization the practitioner would be very anxious to retain or obtain hospital privileges. This would be of particular interest because the present tendency of our larger hospitals is to limit hospital practice, especially on the public wards, to certain practitioners of proved ability. and industrial concerns, insurance companies, and even compensation boards, favour the concentration of their work in a few hands. This tendency to limit certain privileges would most likely be increased under a health insurance scheme. Again we must consult precedent elsewhere. Germany affords us an interesting study.⁶ There the large majority of the hospitals are closed, and the hospitals or services are under a full time "head doctor" with one or more assistants. Although the chief is a full-time man, he is allowed to do a little private practice. However, he must take his private patients to a private clinic, not to his own hospital. Vacancies in the larger hospitals are filled by advertisement, not by promotion. Salaries are small, especially for assistants, and marriage must be delayed. In some Bavarian hospitals the doctor is remunerated by receiving 10 per cent of the hospital's charges to the patient. In some hospitals all private fees are taxed. There are private clinics, but socially insured patients cannot attend them.

A great deal of the staff doctor's time is consumed in keeping up records. This is irksome to the doctor who is not interested in the clerical side of the work. His training has been a scientific one, and he is devoting his time to the consideration of diseases which seldom recognize any rules or regulations. As Kerschensteiner points out,⁶ "Highly trained medical men are kept busy—wasting valuable time—doing routine work." There is also a tendency for such a scheme to break down the personal relationship between doctor and patient. This has caused much adverse comment in England, as well as in Germany. In most cases patients are sent from their family physician, in whom they have confidence, to an unknown specialist. This lack of what one German writer characterizes as "the human touch" has resulted in a tremendous increase in quacks—one to every four regular practitioners. "The system is used not for obtaining health, but doles." It has increased sickness and prolonged convalescence. Another feature is that the rapid increase of polyclinics or ambulatories has seriously affected private practice. This is bad for the patient, as diagnosis is

hurried, there is no continuity of medical supervision, and the patients lose a great deal of time.

It is possible that many of these difficulties could be overcome in Canada, but to do so would require the most intense study and consideration. It is quite probable that an effort would be made, and perhaps rightly, to limit certain technical therapeutic or operative procedures to experts in these fields. Also, because of the great possibilities for malingerers or fraud, much greater in medical cases than in the traumatic cases handled by the compensation boards, an extensive system of consultation or review boards would be imperative. Therefore, to the medical staffs of hospitals this matter of health insurance is one of vital importance.

THE EFFECT UPON UNIVERSITY HOSPITALS AND MEDICAL SCHOOLS

What effect would it have upon our university hospitals and our medical schools? There are few reliable data available to assist us in answering this question. The officers of some of the teaching hospitals in England are quite concerned. Some university teachers anticipate a falling off in the number of indigent patients available for the demonstration of disease, patients who thus repay in small part for the skilled treatment gratuitously given. Would university hospitals come under the government, as in Denmark where the Rigshospital or University hospital is under the Minister of Education, and where the hospital doctors are state-doctors? In Sweden the superintendent is chosen from amongst the attending doctors and is appointed by the government. In Germany the insurance companies are bringing pressure to bear on the medical schools to place more emphasis on teaching for insurance practice.¹

These are but a few thoughts that come to mind upon this subject of health insurance and its possible effect on hospitals. It is not likely that we shall ever duplicate here the systems developed abroad, but there is no doubt but that further radical changes may be anticipated in our own methods. What modifications do come will probably come gradually. In this address I may have emphasized some of the less desirable features of health insurance as it pertains to hospital practice. However, these experiments are still young and, should we be required to develop a new system of medical care here, we should profit by the experience elsewhere. As Sir George Newman so well ex-

pressed it in the 1930 Halley Stewart Lecture,⁷ "Speedy methods of social amelioration have at all times in history brought their own complications and trouble with them. A nation is not a machine which can be speeded up; it is a living organism which grows." It is most timely that our medical staffs should consider this subject very seriously, not that we desire to hasten the precipitation of an experiment fraught with many potential dangers, but because we, as hospital workers, should be prepared, on behalf of the hospitals and our future patients, to be of

constructive assistance in the moulding of public opinion and legislative action.

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HOSPITAL NEEDS OF TO-DAY*

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THREE types of public hospital administration are to be found in Ontario. First, there are the mental hospitals administered by the Provincial Government and charging back a part of the cost of the care of indigent patients to the municipalities in which they reside. Secondly, there are the civic hospitals, of which we have only five in the Province, excepting isolation hospitals. These civic hospitals are operated entirely by the municipalities. The third group are the hospitals operated as voluntary institutions by charter from the Government. Thus we see that the public at large has already gone some distance in recognizing its responsibility for the treatment of the sick. The Ross Commission, appointed by the Provincial Government to study the hospital situation in the province, stated in their report that the whole cost of the care of the indigent sick should be borne, one-quarter by the Provincial Government, and three-quarters by the municipalities, and where such patients come from unorganized districts the whole cost should be borne by the Provincial Government. The principle laid down in that report is one which the public hospitals of the province have been fighting for over the years. During the past few years, the combined government and municipal patient per diem grants have been increased from seventy-five cents to two dollars and thirty-five cents, through the constant

efforts of the Ontario Hospital Association. The average cost of the care of patients in the public hospitals has increased during the same period from about two dollars to four dollars per patient day. So the public has a long way to go yet before they are meeting the cost of the care of the indigent sick.

Another serious matter is that citizens of other provinces or countries, mainly tourists travelling in automobiles through the province, injured and taken to the nearest hospital, often have not the means of paying for their treatment and the hospitals receive nothing in such cases. The same applies to floaters, hoboos, sailors, and all others who have not lived three of the five months preceding their admission to hospital in some municipality in Ontario, and for the treatment of whom the hospitals receive nothing. Then, until just recently, the Government has practically refused responsibility for patients in all public hospitals except the Sick Children's Hospital, Toronto, and the sanatoria for tuberculosis, after 120 days, giving a grant of only 10 cents per day after this period. The regulations have now been changed so that patients in public hospitals who are suffering from tuberculosis are to be paid for after the 120-day period. Previous to the first of October, 1931, hospitals received nothing either from municipalities or the Government for the care of babies born in hospital of indigent mothers. Now the Government pays 30 cents and the municipality must pay 90 cents per day for 14 days for the care of such babies. So, you see, some little progress is being made

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toward the principle as stressed for years by the hospitals and agreed to by the Ross Commission.

Another load which the public hospitals have to bear is in connection with the treatment of mental cases, who frequently must be admitted to these hospitals in the early stages of their trouble, who sometimes have to be retained in hospital for some time owing to inability to get them into mental hospitals. The general hospitals often are not equipped to isolate these patients and give them the treatment they need, excepting at great cost. The public bears the whole cost of the care of such patients if they are treated in mental hospitals, but when they are treated by the general hospitals, not half the cost of their care is borne by the public. The same situation also applies to narcotic addicts. It is with great difficulty that general hospitals care for such patients. They must be isolated, but the hospital has no legalized control over them and they can walk out whenever they feel like it. There are no hospitals definitely set apart for their treatment, so finally a large percentage of them come under treatment in the jails and prisons of the province. One of the needs of the day, then, is that institutions for the care of addicts and early mental cases should be set up throughout the province. I believe the most effective way to do this would be to encourage many of the large hospitals to provide special facilities for the purpose, and that the Government should reimburse them for the full cost of such facilities, and should also meet the full cost of the treatment of patients who are indigent in such institutions. Such a method would mean that a fairly large percentage of mental diseases could go to their own general hospital and would never find their way to the mental hospitals. They would, in most cases, go voluntarily to the general hospital, and thus a stigma which still clings to incarceration in a mental hospital would never be placed upon them.

Another of the pressing needs of to-day is more facilities for the treatment of tuberculosis. At the present moment there are hundreds of open cases of this disease in the homes, frequently small homes which lack modern conveniences. The lives of the children of the family are thus jeopardized because no hospital beds are available for them. It does seem to me that we have at hand one ready method for the partial solution, at least, of this condition, and that is, that in a number of the larger general hospitals all over the province some wards be set apart for the treat-

ment of tuberculosis. Many general hospitals have as high as fifty per cent of their beds unoccupied, so that we have no shortage excepting in isolated places. There seems to be no good reason why, with reasonable safeguards, some of these beds should not be used for cases of early tuberculosis. It would mean that many of these would be hospitalized much earlier. The patients would be near their own homes and friends and many of them might never need to be transferred to sanatoria. Of course, in selecting these care should be taken, particularly where they are to be admitted to some of the hospitals in smaller cities, that they be patients who are in need only of routine hospital treatment and isolation from their families. If chest specialists were not available in all of these communities, the travelling chest experts of the Provincial Government should see such patients periodically and confer with the local physicians regarding them. Another method of caring better for tuberculosis, would be to provide convalescent hospitals to which patients could be transferred from the sanatoria, who cannot be sent back to their homes but who do not need the active treatment which the sanatoria are equipped to give. Considerable expense could be saved by operating these convalescent hospitals, as the equipment and personnel would be much less costly than in the sanatoria. Such convalescent hospitals are now operating very successfully in England and other countries.

The hospitals need advocates, particularly amongst the medical profession, to teach the public that hospital care is not extravagantly expensive. About seventy-five millions of dollars of private money have been put into hospital buildings and equipment in Ontario, and neither interest charges nor depreciation charges have ever been calculated upon this money in computing the cost of the care of the patients.

In asking the Government to increase the amounts payable by municipalities for the care of indigent patients, the Hospital Association is constantly faced with strenuous opposition from representatives of municipalities, whose main argument is that these costs are too high. We feel that no one can successfully argue that three dollars per day is too much for a first-class bed, special diets, medicines, x-ray examinations, operating room technique, maid and orderly service, and expert nursing. It is difficult, however, and takes a long time, to get the truth

into unwilling minds, and particularly is this true where it means digging into pockets.

It is notorious that the public ward patient in most large hospitals has a better opportunity of securing all the expert medical services available at the hospital than the great majority of private-ward patients. The public-ward patient gets them free. The semi-private and private-ward patient must pay for them, often more than he can afford to pay. The practice whereby sometimes as high as seventy per cent of the patients in a hospital are treated by the attending staff gratuitously, is vicious, and is certainly destined to come to an end sooner or later, and I hope it may be soon. It reacts unfavourably upon the medical profession. The public are apt to say, "Oh, well, the doctors charge the people who can pay enough to make up for their free services." If this statement is in any sense true, and I think it is, because doctors must live, then the principle is wrong, because it means charging the sick who can afford to pay not only enough to cover the cost of their own sickness but also sufficient to cover the cost of the treatment of the indigent. The whole public should pay these charges and not any one section of it. Therefore, doctors should be paid by the State for their treatment of the indigent sick in general hospitals, just as they are now being paid for the treatment of the indigent in mental hospitals and isolation hospitals.

Some solution must be found for the problem of the impossible charges which would face the ordinary wage-earner, who is not in the habit of getting anything he does not pay for, if he received all the expert diagnostic and treatment facilities which he frequently needs in hospital. His ordinary hospital care costs from \$2.50 to \$4.00 per day, or a maximum of sixty dollars on the basis of the average stay in hospital. The other charges, however, if he is to have the advice and treatments that are often necessary, may run into many hundreds of dollars. He knows he cannot afford such services, so in many cases he does not get them, and suffers, or dies, accordingly. The day must speedily come when these necessary diagnostic and treatment facilities will be made available to such patients by the State or by some system of compulsory insurance.

I do not want to see any system of State medicine which will prevent any self-respecting citizen consulting the family doctor of his choice, but I believe that even this service might be rendered to great advantage upon an insurance basis

similar to our Workmen's Compensation Act, but the more specialized and consequently more expensive services should certainly be upon a state or insurance basis. The hospitals are vitally concerned in this matter, because poor or inadequate medical or surgical treatment or patients within their walls reacts as greatly against their reputation for efficiency as against the medical profession. Might I also point out that the lack of early diagnosis or proper treatment of patients outside of hospitals is also of vital interest to hospitals, because such patients very often find their way into hospital in a hopeless condition, die, and the mortality is charged against the hospital.

If hospitals are to be as efficient as they should be much has still to be done in the re-organization of the medical profession with regard to hospital practice. In the first place, the so-called "closed" hospital is entirely unethical professionally and is not calculated to make for the highest results to hospital patients. May I hasten to make plain my meaning. I would have every hospital a closed hospital in the sense that every doctor practising within its walls should be on its staff. However, one of the qualifications of every young graduate in medicine should be that he be a member of the staff of some hospital in the community in which he begins practice. If he is not qualified to practice in hospital he is certainly not qualified to practice outside of hospital. All hospital staffs should be obliged to meet regularly. Every staff member should be obliged to report his mortalities, both in and outside the hospital, to his staff meetings. He should have the benefit of the constant post-graduate education which he would receive by obligatory attendance at hospital staff meetings. If, after a reasonable number of years of scrutiny by his medical associates, he is found by them to be unqualified to practise medicine, there should be some means of directing him to some other line of business. The weakness, then, of our present system is that a fairly large percentage of physicians are not attached to any hospital, and they and the public they serve, and finally the good name of the hospital, are suffering because of it.

Voluntary hospitals operated under the direction of voluntary Boards of Governors, and built by funds from voluntary sources, are an outlet for private philanthropy and, I believe, offer the ideal form of hospital service. These hospitals, however, should not be built with the idea only

of furnishing free care to the indigent sick and charging the full cost to the ordinary salaried man. Depreciation and interest charges upon the buildings and equipment should be met from these voluntary sources or from state aid, and only the cost of current operation charged to the ordinary paying patient. The cost of the care of patients who are unable to pay should be borne entirely by the state or by some form of compulsory health insurance.

One of the most important needs of the present day is a complete reorganization of the nursing service in general hospitals. The primary duty of a hospital is to give an adequate nursing service. In most hospitals this is not being done. Businesses train junior employees in order that they may be more efficient later on. Nurses are being trained mostly to go out of their hospital and do private duty nursing. The private duty nurse is not receiving too much for her services, for the simple reason that she is constantly faced with the hazard of waiting for another case, and the sum total of her earning over the year is very meagre. Every patient in hospital should be receiving a complete nursing service by employees of the hospital. If a patient desires and can pay for a special nurse for twenty-four hours of the day, he should be supplied one, not privately, but by the hospital. Upon a basis of averages in

the larger hospitals nurses could be kept on the staff, nursing services could be charged patients by the hour, and the cost of a twenty-four hour special nursing service would not be over \$8.00, where it is now \$14.50. Nurses are being employed by hospitals at a maximum of seventy-five dollars per month, and their board and room costs about \$1.00 per day. So that on a basis of twenty-five working days per month, they would cost \$4.00 per day, where they now cost the patient \$7.25.

SUMMARY

Some of the hospital needs are:—

1. Continued encouragement in building and equipping voluntary hospitals.
2. Payment of the full cost of care of the indigent sick in hospitals, including medical care, by the State or compulsory insurance.
3. Placing of every physician on the staff of some hospital.
4. Charging ordinary paying patients only the current cost of their hospitalization.
5. Providing a means whereby such patients may receive special medical and surgical facilities at much less cost than at present.
6. Provision of a complete nursing service by the hospitals.

THE IDEAL HOSPITAL OF THE FUTURE*

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After a short introductory note of a historical nature, this paper continues. [Ed.]

IN Canada, one hundred years ago, there were only a few hospitals, these being located in the larger cities, but during the last half century the number has seen a very rapid growth, until, in 1929, there was in Canada a total of 886, providing 74,882 beds. As a matter of fact, these totals are increasing month by month. If this rapid growth were the result of a well thought-out plan of organization we might believe that our modern hospital is the last word in the application of medical science, but when we

come to look into the matter we find that there is a great lack of uniformity in the service provided, and that only in the larger hospitals, which serve as teaching centres, do we find any well balanced organization, combining with beds for treatment clinics for ambulant cases and facilities for diagnosis, the combination of which could be looked upon as providing a reasonable health program for the community in which the hospital is placed. The smaller the hospital, the more does it confine its activities, as a rule, to treatment of acutely ill patients in its community, and the scientific work of serving to find out what is wrong with people is in great part neglected. This tendency is reflected in the attitude of the public to hospitals as expressed by legislation for their support, for if we are to judge of

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the opinion of legislators, and therefore of the public who elect them, we must conclude that the only service which they appreciate is that rendered to sick people who can be given treatment in hospital beds, the same as was the case in the hospitals of the Middle Ages. Of course it is easier to count the number in a hospital and to determine the financial assistance on that basis than it is to place a value on the scientific investigation that is done in an institution, but if the public is ever to place a true value on the prevention of illness, this present system of financing hospitals by paying grants on the basis of the number of days a patient stays in a hospital bed must be replaced by some other plan that seeks continuously to keep people well.

In trying to solve our social problems, it is well for us to watch the progress of events in England. In that country until recently they had three types of institutions. For the very poor, there were the poor-law institutions; for the middle class, there were the great voluntary hospitals maintained by donations from the people; and the well-to-do were cared for chiefly in private hospitals or nursing homes. In addition to these there were the military institutions for the treatment of soldiers who had served in the Great War. Never before had so great a number of the people of the nation given military service, and never before were there so many people who looked upon their hospital service as a right which they had earned through this service. As a result of so many ex-service men receiving from the state the hospital service which they required, and as they refused to accept this service in poor-law institutions, a feeling gradually grew up throughout England that in the matter of treatment of disease her citizens would no longer abide the taint of poverty, and, as a result of this attitude, the poor-law institutions have had to be nationalized and modernized, not only by being equipped with modern facilities for the treatment of cases requiring admission to hospital beds but also for diagnosis and for treatment of ambulant cases. In a recent report, Sir George Newman has said that the taking over by the Department of Health of the poor-law institutions was not a step desired by them, but that it was forced upon them by the will of the people, and that this was probably the greatest step that has ever been taken in the advance of medical organization in Great Britain.

Another very interesting reaction of the

British people to hospitals has come to light as a result of their experience with the Panel System of medical services. In the olden days the great voluntary hospitals of London provided a diagnostic service that has been admired and copied throughout the world. With the coming of the Panel System it at first looked as if these outdoor departments would no longer be able to function, for with the new system a large percentage of the people was provided with what appeared to be a fairly complete medical service, and eventually it was thought that this plan would be extended until it included practically the whole nation. Many factors have operated against the carrying out of this plan in its entirety, the chief of which, of course, was finance. It was believed that with such a complete health service, the amount of illness would gradually decline, and that, from year to year, decreasing costs would make it possible to extend this service to a larger proportion of the people. But, contrary to all expectations, the number of people claiming benefit for sickness has from year to year increased and the costs from year to year have mounted. As a result, the cost of this service to the nation has become so great and the deficit has become such a burden that it has not only been impossible to extend the service, but, in the recent attempts to balance the budget, the amount paid to doctors for their services to the people has been reduced, and it is questionable if the efficiency of the service has not been further decreased.

But a greater cause for inefficiency in the Panel System is due to the fact that it failed to supply the diagnostic service which was the chief feature of the outdoor service. At first these outdoor clinics saw a very considerable reduction in the number of their patients. However, as time went on, the people receiving service from panel doctors found that the more popular the doctor and the greater the number of patients he had on his list, the less time had he to give them an adequate diagnostic service, and, as a result, it was found that the practice of supplying bottles of medicine in lieu of diagnosis gradually reached such proportions as to become a real menace to efficiency. As a result of all this the people of London and the larger cities are drifting back to the outdoor departments where they can receive adequate study of their cases. Undoubtedly this would be a step in the right direction if this diagnostic service of the voluntary hospitals was recognized by the state, but when these hospitals are compelled, as in past

days, to look to the donations of the rich for their financial support, and when the rich are finding it impossible to carry the heavy burden of taxation, to say nothing of continuing charitable donations, the future of the voluntary hospital has become a matter of great concern. As a matter of fact, some, for instance, Brompton, which treats consumptives, have been very glad to receive rates from the public health authorities on the basis of a certain grant per day for maintenance of patients sent them by the public health departments, and probably the future will see a greater drift back to these voluntary hospitals on this same basis.

Thus, I think you will agree, that the people of England are not realizing their expectations through the Panel System, a system in which the medical service is supplied by a single practitioner or by a partnership of two or three men, and that the drift seems to be back to a combination of the general practitioner and an efficient hospital service. It would seem to me, therefore, that in trying to plan an ideal hospital service, the experience of the British people should be taken very seriously to heart, for this drift back to the outdoor clinics of the voluntary hospitals in my opinion is no chance occurrence, but is really a result of the fundamental principle in scientific medicine that treatment must always be based upon a diagnosis of the disability to be treated, and while symptoms must sometimes be immediately alleviated by the administration of drugs, yet at all times the chief business of the doctor should be the thorough investigation of his case so as to arrive at an accurate diagnosis and adequately treat the main cause of the disability. In the light of these experiences can we not improve the organization of our hospitals in some way, so that they will provide a diagnostic service that will be available both for the citizen who is ill and for the doctor who is responsible for his recovery? Such a plan could be worked out in a practical way, at a cost that would not be prohibitive, and with results that would be satisfactory, not only from the reduction of illness but also from the gradual reduction in costs of the service.

In all the discussions that have taken place on state medicine, the one idea that has been most generally accepted is that the family physician must be retained. If this is a necessary principle, then the common sense thing would be to help to establish the family physician as the very corner stone of an efficient medical service.

Probably the greatest trouble with our present service is that instead of having changed promptly to meet changing conditions we are still trying to carry on with an out-of-date organization, an organization that was fairly efficient in meeting the needs of a few decades ago but is totally inadequate to-day. Then the family physician did not need to worry his head about an x-ray investigation, for such a thing was unknown. Then, too, the laboratory investigation consisted in little more than very crude methods of examination of urine and simple procedures dependent for the greater part on close powers of observation. Today, in some obscure cases, we require a whole series of extensive procedures, such as, investigation by the electro-cardiograph, by the metabolimeter, intricate blood tests, spinal punctures, and examination of spinal fluid, in fact, so many intricate procedures that it is needless to attempt to enumerate them.

If the Panel System falls short, both through excessive cost and through not providing a scientific diagnostic service, why cannot we try the plan of reorganizing our hospitals, making them a part of a nationalized health service, and using them to provide diagnostic facilities for the general practitioner, in an earnest effort to prevent or postpone the development of incurable conditions by recognition of these conditions in their incipient stages? In order to try to prove that such a plan is not altogether impractical and not altogether contrary to the genius of medical organization in this country, I would like to point out, briefly, some of the changes that have been recently introduced in this Province, and in this Dominion, along the line of assistance in diagnosis, or in prevention of disease, so as to demonstrate the principle, now generally accepted, that curative and preventive medicine cannot be separated. In fact, this development has already gone so far that we might very well call it the Ontario plan, or the Canadian plan, for an improved medical service. Then, if we are willing to go this far, there should not be much objection to reorganizing our hospitals so as to bring them in line with this definite trend of development.

Let us first note the diagnostic procedures that have been introduced in recent years through the assistance of aid from the province, or from other funds obtained from public or private sources. First, then, in the field of tuberculosis, I would mention the assistance offered through travelling diagnostic clinics under the Provincial

Department of Health. These travelling diagnostic clinics are now available to a limited degree for every section of the province, at the request of the medical association of that district. Patients are examined only at the request of the medical practitioner and the report of the investigation is sent not to the patient but to the general practitioner, the responsibility for the case throughout being left with the recognized family physician. This provincial diagnostic service is working hand in hand with what might be called an extension diagnostic clinic service operated by the sanatoria in the districts surrounding their institutions, and wherever this plan is operated a decided improvement in the tuberculosis situation gradually manifests itself. The trouble with the plan is that there has been no definite fund for its financing, but recently the sale of Christmas seals has frequently been used for this purpose, and in some cases the clinics are financed by the local boards of health.

Another illustration of organization for diagnosis is the extension clinics in connection with the mental hospitals of the province. This is a more recent step, but one which was considered necessary to try to overcome the shortage of beds for mental cases. Already clinics have been organized in several centres with very satisfactory results. If the actual onset of insanity can be prevented by the discovery of mental abnormalities in their incipency, who can foretell the benefit of this step to the province, both from the economic and health standpoints? We can be very sure that the plan will be watched with great interest, and it is hoped that much good will result, both from decrease in the number of mental cases and from a decreased demand for hospital beds for such cases.

Another very perceptible growth in the use of diagnostic agencies, which is very evident at the present time, is the increase in the use of the outdoor departments of hospitals where these are already organized. This change has come about to a great extent as a result of the unfortunate situation resulting from unemployment and in the inability of families to pay for the services of their family physician. Whatever the final result, it certainly shows that the outdoor service of hospitals is necessary as a relief measure to meet the needs of the present situation, and it would seem that the next step would have to be to make this a well organized department with an administrative official of the hospital in immediate charge. There is little doubt, too,

that if the information obtained by investigation in these outdoor departments were made available for the family physicians of these patients who are temporarily unable to pay for medical services the treatment of the conditions found would in many instances be far more efficiently carried out by these same family physicians than under present conditions.

As a fifth development, which has to do with the improvement of the diagnostic service of practitioners, I would like to mention the post-graduate service sponsored by the Ontario Medical Association through funds derived from a special donation. With medicine a progressive science, it has been found absolutely necessary to take the newer knowledge to the men in general practice in the distant parts of the province, and in this plan, in which Canada is leading the world, we have in practical form a demonstration of the principle that a graduate in medicine has entered a profession in which he must always be a student, and undoubtedly the people of the province have already benefited by this plan out of all proportion to its cost.

The above measures, because of their aid to diagnosis, are indirectly preventive. In addition there are certain directly preventive measures that have been established by the Provincial Department of Health. These need merely to be enumerated, as they are so well known and so widely used. The list includes the free supply of small-pox vaccine, diphtheria antitoxin and various other antitoxins that have been found efficacious, and, in later years, toxoid for immunization against diphtheria and a vaccine for immunization against scarlet fever. Various other preparations are also supplied free of cost by the Provincial Department of Health, a recent production being blood from patients who have had infantile paralysis. This will be added to, there is no doubt, from time to time, but the principal feature of the service is that prevention of disease is recognized as a great national asset. If to these measures of the Provincial Department of Health could be added a full time public health service such as is in operation in Great Britain we would have a public health service excelled by no other country in the world.

Now for one moment let us discuss the organization of the outdoor departments of our hospitals. In a few hospitals, the outdoor department is used as a means for the education of medical students, and here the diagnostic service is most efficient. About these hospitals

I have nothing to say, except to hold them up as an example for other hospitals that do not serve as teaching centres. Outside of these institutions, the outdoor departments of hospitals are still in most cases very unsatisfactory. In most cases the histories taken are very sketchy, and, in fact, in many cases no history that really deserves the name is recorded. Rarely do we hear of a definite weekly program for a patient, commencing with a complete history, followed by a preliminary investigation, this to be followed during the next few days by various clinical investigations which are suggested by this preliminary investigation, and the whole to be finally correlated by a study of the complete records and by a final diagnosis. All too frequently the out-worn idea is re-established that to obtain a bottle of medicine is the sole purpose of coming to the outdoor clinic.

Personally, I would like to see this diagnostic work organized as the first unit of the hospital service and would like to see it made compulsory in every hospital. Then, with the history and investigations completed, and the diagnosis established, and after a social service investigation to determine what share of the cost of the work the patients can pay, the complete reports could be typed and forwarded to the family physician who has requested the investigation. In most cases, when relieved of the excessive cost of clinical investigation, the patient would probably be able to pay his own physician, and even when he is unable to do so it might be considered more economical for the municipality to pay the family physician a fixed rate for service to indigents, instead of having treatment invariably carried out at the hospital as at present. In any case the principle should be recognized that in ordinary cases the investigation made by the outdoor department is available for the family physician, thus divorcing the stigma of indigency from the outdoor service, and making that service available not only for indigents but also for any tax-payer of moderate means at the request of his physician.

Thus we would be able to establish accurate diagnosis as the foundation of our medical service, and our hospital service, instead of being planned chiefly for the treatment of indoor patients, would be subject to the following classification:—1. Diagnostic service; 2. Social service department; 3. Department of outdoor treatment; 4. Department of indoor treatment. Thus every family physician would be in intimate

contact with his nearest hospital, receiving the help in the service of his patients which he alone cannot give them, and which today the patient too frequently fails to receive at the proper time. The criticism may be raised that this plan will drive consultants out of practice or reduce them to the rôle of family physicians, if that be considered a lesser rôle. This I do not believe will be the case, for so soon as we educate the public to thoroughly understand that diagnosis is the first essential of adequate treatment, we shall have an ever increasing demand for the diagnosis of disease in its early stage, and, as is well known, the more incipient the lesion the more difficult is the problem and the greater will be the requirement for training and experience on the part of the consultant. It seems to me that by such a plan the consultants, who will be the leaders and teachers in medicine, will have their work increased rather than decreased, and that, conversely, the field for the inefficient physician and for the quack and cultist will gradually decrease because of a more enlightened public.

But what is to be done with the small hospitals that do not even attempt to carry on an outdoor department? These institutions, because of their difficulty in financing their indoor and operative departments, cannot even attempt to give an outdoor department for which no funds are procurable, and so they are for the most part merely treatment institutions for patients who need to be hospitalized, in order to secure service for acute conditions, or in order to secure surgical care and convalescent after-care. These institutions are located in our larger towns, sometimes serving the town alone and sometimes also the surrounding district. Undoubtedly they provide a very convenient service for the people of that community, but as for meeting the health needs they do far less than they would be able to do if our hospitals, large and small, were financed in a scientific manner based on service rendered, instead of on the municipal rate of so much per day per hospital bed.

How then shall we provide an ideal hospital service? In suggesting changes at the present time, I am only interested in the hospital service from the community standpoint, and, first of all, I would advance the claim that every part of the province should be hospitalized, either in relation to our present hospitals, or, if these are insufficient, others should be added so that the hospital would be within reach of every citizen of the community on some reasonable basis as

regards distance, and facilities for service. Possibly several of the smaller hospitals would have to be correlated with one larger central hospital, the latter to have all the modern equipment that would be necessary in our very best institutions, while the smaller would be required only to provide certain absolutely necessary essentials of equipment. As a corollary to this would be the principle that every citizen would have a right to look to the hospital for assistance, and, conversely, he would be compelled to support that hospital. In other words, I can see no reason why both the capital cost and the diagnostic service of our hospitals should not be financed on a community basis, somewhat the same as is done in the case of our school service.

Apart from universal contribution towards the capital account and the diagnostic service of the hospitals, I do not think any very radical changes are necessary and in so far as maintenance of patients in hospitals is concerned, I see no need to change our present system, except to equalize the rates to supporters of nationalized hospitals, and to reduce the cost gradually wherever this is possible. Possibly a solution in the matter of both hospital maintenance costs and medical fees to physicians could be found by the establishment through independent sickness insurance companies of individual and family sickness insurance. With this diagnostic service provided for on a nationalized basis I do not think it would ever be necessary to nationalize treatment as has been done by the Panel System, for our present system of caring for the treatment

of indigent patients could very well be continued for what would probably prove to be a gradually decreasing percentage of the population. With regard to details of organization of a diagnostic outdoor service as the chief feature of the changes suggested, there would, of course, be need for a very considerable increase of clinical and laboratory staff; such would need to be full-time men, most of whom could be recent graduates who in addition had completed internship in some well recognized hospital, and who for the experience to be gained would take a small salary for two or three years, as a step towards the vocation of the family physician, a goal that would thus be greatly enhanced both because of their greater experience and because of their greater opportunity for practising scientific medicine. These are matters, however, which need no discussion here, for they have been discussed in detail in the report of last year's Inter-Relations Committee. In this way it seems to me therefore, that by making hospitals universally available and universally supported we would do away with the need for any nationalized medical service as it is understood in England today, but, with our hospitals organized on the basis of a diagnostic service available to citizens of limited means as an aid to their family physicians Canada could point the way to a new medical era through the development of a scientific service that would be both practical and efficient, and in harmony with the sociological standards of our day

XANTHOMATOSIS: (SCHÜLLER-CHRISTIAN'S DISEASE; LIPOID HISTIOCYTOSIS).—Merrill C. Sosman discusses the cholesterol disease of Schüller-Christian, its manifestations, its natural course, and in particular the effect of roentgen treatment on the local deposits and on the signs and symptoms of systemic disturbance. To that end he reviews three cases that he has reported previously and brings them down to date, reviews and brings down to date one case reported by Christian in 1919, and reports two new cases. He summarizes his study by stating that xanthomatosis (lipoidosis, Schüller-Christian type) is due to a disturbance of lipoid metabolism and is characterized by deposits of lipoids, chiefly cholesterol and its esters, in various organs and tissues in the body. The signs and symptoms depend on the location and extent of these deposits. Chief among them are defects in the bones, exophthalmos, diabetes insipidus, gingivitis, cessation of growth, and occasionally adiposogenital dystrophy. Treatment has been ineffectual with the exception of roentgen therapy to the areas of lipoid deposit, which has uniformly resulted in prompt healing changes. The improvement has been most marked as regards the disappearance of the defects in the bones, least marked as regards the exoph-

thalmos. The change in general or systemic signs and symptoms depends on the areas treated and not on the quantity or quality of the therapy given.—*J. Am. M. Ass.*, 1931, 98.

THE NINE PROPERTIES OF WYNE

Wyne of nature hathe properties nyne;
Comforty the coragis; clarifieth the syght;
Gladdeth the herte, this lycor most devyne;
Hetythe the stomake, of his natural myght;
Sharpi the wittis; gevith hardines in fight;
Clensyth wounds; engendrithe gentyl blode.
Licor of licor, at pestis makyth men lyght,
Scoureth ye palat, through fyne ye color good.

—John Lydgate.

Yif thou wilt been hool and kepe the fro sykness,
And Resiste the strook of pestilence,
look thou be glad and voyde al hevyness;
ffleen wykked Eyerys eschewe the presence
of enfect placys Causing the violence;
drynk good wyn and holsom metys take,
Walk in Clene Eyr eschewe mystes blake.

—John Lydgate in *Secrees of Old Philisiffes*.

THE VALUE OF X-RAY DIAGNOSIS IN MEDICO-LEGAL CASES*

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XIII

THE use of x-rays in medico-legal cases began shortly after the discovery of the rays. Unfortunately the first legal cases that occurred were due to burns caused by the rays. Later on the usefulness of x-ray evidence was called in to help in legal cases where the patient had suffered a fracture and the x-ray plate was allowed as evidence of the fracture. A time came when the operator who made the actual roentgenogram was haled to court to swear that the radiograph shown as evidence was really the one he had taken. During this period or phase of the law I spent a whole day in court to give evidence, and though I would swear that the roentgenogram was that of the patient and that it had been made in my department I had not personally pressed the button when the x-rays were used and therefore the judge would not allow me to give evidence. It is seldom now that the radiologist is called upon to testify that he made the picture. In a large department with several technicians, each making several dozen films a day, it would not be possible to be certain that a technician would remember the actual making of the radiograph in question, and frequently after he has made the exposure he does not even see the finished film and so is in no position to swear that it was made by him. Such technicalities are now waived, and the word of a responsible doctor is accepted that the film under consideration is the film of the patient in question.

The first medico-legal aspect of the subject was, as I have said, in relation to the burns caused by x-rays. The earliest reference I have been able to find was the report in the *British Medical Journal* of April 8, 1899, of a case in Paris, when Mme. Moekert had her hip examined by x-rays. The first "sitting" lasted 40 minutes,

the second 45 minutes, and the third an hour and a quarter. The court decreed that a medical commission be appointed to decide as to the duration of the examination considered safe. Two years later the *Lancet* reported the continuation of this case. When the case came up for trial the defence was that the method of application of radiography was not yet formulated, that no one knew the conditions which gave rise to burns in some people and not in others, and that consequently the radiographer was not responsible. The court, however, gave the full amount of damages asked for (5,000 francs) and found that the radiographer had acted imprudently, more like a workman than a medical man, and that his apparatus was defective. The judgment was subject to appeal. It is interesting nowadays to think of exposures of 40 to 50 and 75 minutes in order to make a roentgenogram. The quantity of x-rays which will cause a burn is pretty exactly known now, and though there may be a slight difference in the reaction of one person compared to another the difference is not sufficient to justify a statement that a dose which will have no effect on one person will cause a serious burn on another.

Again the London *Daily News* of May 1, 1899, records that in Chicago a patient was awarded \$10,000 for injury caused by the x-rays.

In June, 1901, Mr. Golding Bird wrote in the *British Medical Journal* on the medico-legal aspect of x-rays in regard to fractures, and pointed out the necessity of an expert to make the roentgenogram and an expert to interpret it. There is no need to dilate on the fact that this advice is as good as the day it was made. Mr. Bird quotes instances in which a skiagram showed what appeared to be a fracture where none existed, others in which a fracture had been missed altogether, and others again in which owing to the well known translucency of young callus to the x-rays it was possible to show a fracture as still existing which had united sufficiently to bear weight. He arrives

* This is the thirteenth in the series of articles on physio-therapy published in the *Canad. M. Ass. J.* The preceding papers will be found in 1931, 24: 263, 409, 539, 679, 831; and 25: 65, 164, 311, 444, 582, 702; 1932, 26: 62.

at the conclusion that skiagraphy should be employed only as a subsidiary agent in diagnosis, and that even in this secondary capacity its evidence in cases of difficulty and doubt should be received with caution and only after due interpretation by someone whose experience warrants him speaking with authority.

X-ray films can be used to great advantage in medico-legal cases without ever reaching a court. I remember one such case in which a woman fell from a moving street car and claimed that she had a fractured femur above the knee. She was carried to her home where she lay for six weeks under the care of a doctor, and was then transferred to the Royal Victoria Hospital where an x-ray of her knee was made. It showed a fracture above the knee in poor position and callus was present. I formed the opinion that the fracture was much older than six weeks. Shortly after this a representative of the Street Railway Company, the Claims Adjuster, came to see me and said "We admit the accident and the fracture, and wish to settle for it without going into court". In the interests of justice I felt bound to express my opinion that the Street Railway Company was not responsible, and that the fracture might have happened ten years earlier. The agent was dumbfounded and asked me what he was to do. I told him to investigate the accidents brought to hospitals in the city for the last twenty years, and look out for the name of the patient. He did so, and at the third hospital he found the name of the woman and the fracture described six and a half years previously. With full information on the case, he charged the woman with intent to defraud, and she admitted it and withdrew her claim. The company had been willing to settle for \$2,000, and now had nothing to pay.

A pathological fracture occurring, due to the negligence of the same company, also brought the same claims adjuster to me, and once more he told me his company admitted their fault and wished to settle out of court. The x-rays showed a recent fracture of the femur. The surgeon in charge of the case was surprised when I pointed out that the fracture was a pathological one due to metastatic carcinoma. The case went to court as an ununited fracture, and it was admitted in court that it was a pathological fracture, but nevertheless the

patient was awarded \$2,000 compensation. The judge took the view that the company should have left the road clear so that a person suffering from metastatic carcinoma would not trip and so suffer a pathological fracture. The patient died from metastatic carcinoma about six months after the accident.

Medical men who have no right to express an opinion on a radiograph may be heard in court making beginners' mistakes, calling epiphyseal lines fractures, and normal extra bones broken pieces of bone. A thorough knowledge of epiphyses and their times of union is not all that is required for an expert. He also has to know the unusual epiphyses and the epiphyses that do not unite even in middle life. I shall give you two instances of epiphyses of medico-legal importance. At the proximal end of the second metacarpal bone there is a rare epiphysis. It is found constantly in certain lower animals; I have seen it in the seal. In one case of this sort I heard it described as a fracture, and legal action was proposed till I persuaded the patient to allow me to radiograph the bone on the other side, and there was seen exactly the same condition, *viz.*, an extra epiphysis (which I call the "seal" epiphysis) which had not united. The legal aspect was dropped and no court case followed.

Another epiphysis I have seen mistaken for a fracture is the one which occurs at the outer end of the acromion. Such a case was sent to me for examination for compensation as a fractured scapula. It is the only case I have seen in which the epiphysis at the outer end of the acromion remained as a separate bone. The man was 38 years of age and a pension depended upon whether or not he had sustained a fractured scapula. Knowing that it was on record that this epiphysis sometimes may not unite, I rayed the other scapula and found exactly the same condition present in it. The question of pension for fractured scapula was then dropped, and the condition was considered a normal one.

The divided scaphoid bone is frequently found. I believe this always follows a fracture. I have never seen a case in which I considered that a scaphoid bone had developed in two parts. When the scaphoid fractures, one half may degenerate while the other half remains normal; sometimes it is the distal half

which degenerates, and sometimes it is the proximal. This phenomenon is due to the blood supply which enters by the interosseous ligament between the navicular and the capitate. If the fracture is proximal to this ligament the proximal half of the bone stands still and remains as a sequestrum, while if the fracture is distal to the ligament the distal half stands still, while the proximal half with the good blood supply loses its calcium from disuse. Fracture of the semilunar bone is a rare injury. When therefore a patient claims that a recent injury, say seven days before, has crushed his semilunar and the x-rays show a crushed semilunar, one has to be able to distinguish between a recent accident and an old fracture.

The disease of the semilunar described by Alban Köhler came under my notice from a medico-legal point of view recently. The patient claimed an injury to his wrist, and on examination with the x-rays Köhler's disease of the semilunar bone was shown. It was not present on the other side. The case went to court, and on the medical evidence that it was Köhler's disease no compensation was granted. It transpired during the evidence in court that the patient had done only a few days' work during the preceding four years, and in each

case had only been a short time with a good company and then suffered an accident to his wrist. He seemed very familiar with the ways of the law, and the inference was that he was living on compensation derived from nominal accidents during the previous four years.

A thorough knowledge of the formation of callus is necessary. Callus may be present that can be felt clinically, but it may not appear in a film because calcium has not been deposited in sufficient quantity to make itself evident. Certain bones form much callus, like the tibia, femur, radius, and ulna, while the bones of the scalp show usually no callus after fracture.

It is important to know the rare bones of the foot and wrist as these may be called fractured pieces by those who know anatomy only as taught to the medical student. I shall describe a few of these as possible pitfalls in medico-legal cases.

- (1) The os trigonum is a separate part of the astragalus in about 10 per cent of normal feet.
- (2) The os peroneum. This is a sesamoid bone in the tendon of the peroneus longus. It is found in 10 per cent of feet examined, and may be single, double, triple or multiple in appearance.
- (3) The extra-navicular which lies between the astragalus and the navicular. I have

These line drawings are tracings from original x-ray negatives collected from 1915 to 1930. They show the more common extra bones of the wrist and hand. Rarer bones, of which only one example has been obtained, are not illustrated here.

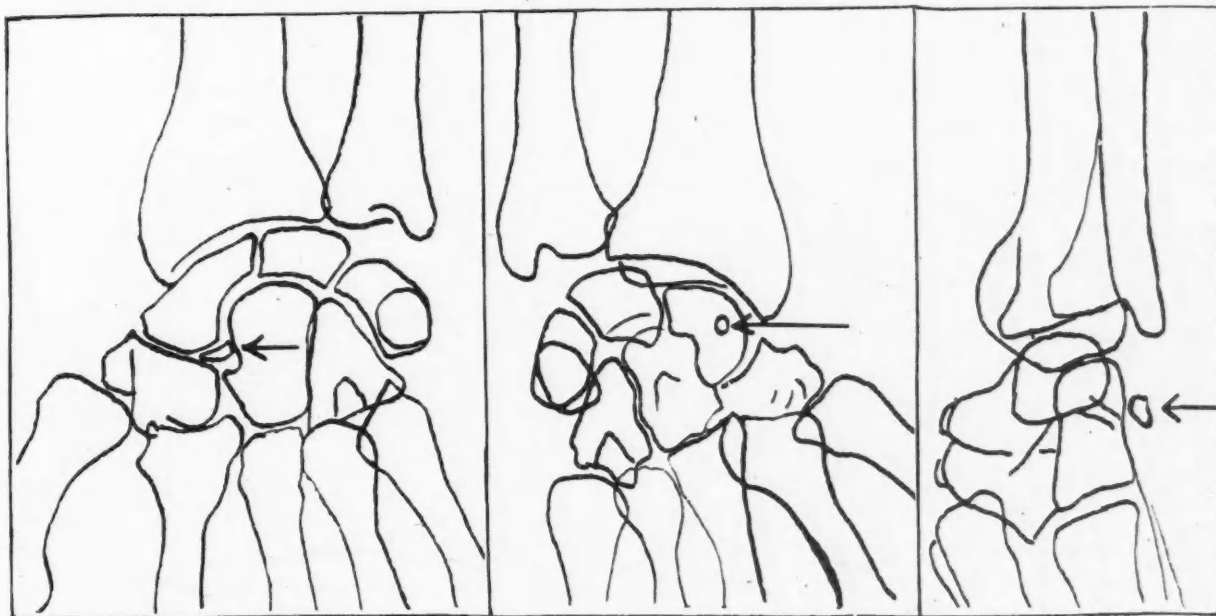


FIG. 1

FIG. 2

FIG. 3

Fig. 1.—Os centrale.

Fig. 2.—A thickening inside a bone, corresponding to a calcified healed lesion.

Fig. 3.—Epipyramis. This name is used here for this bone, but there is no proof that it is the epipyramis of anatomists. It is seen not uncommonly in a large x-ray department.

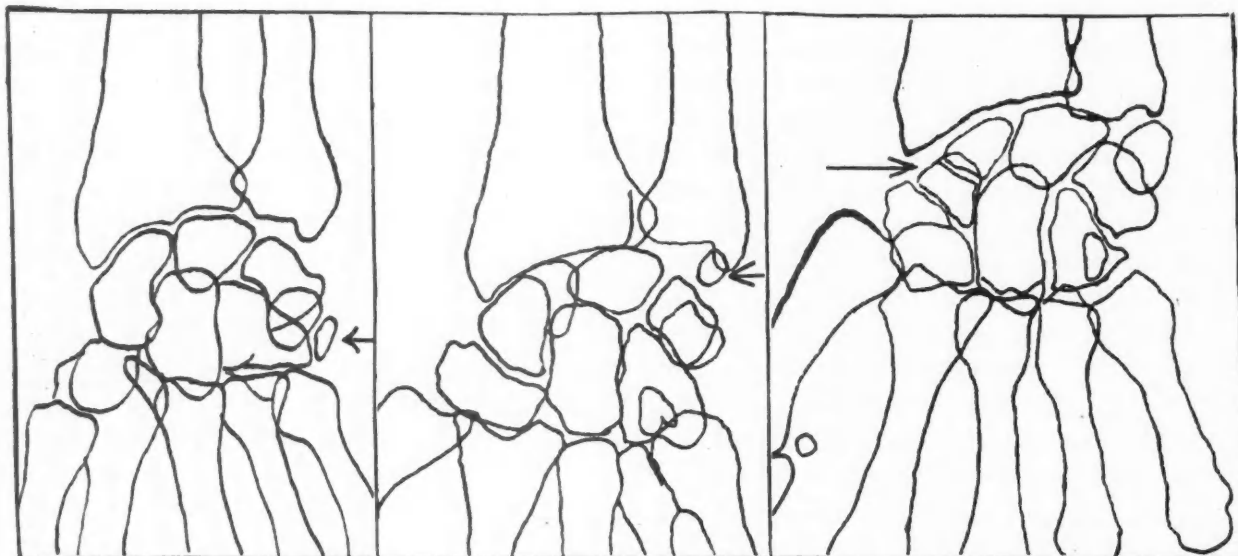


FIG. 4

FIG. 5

FIG. 6

Fig. 4.—What looks like an ulnare externum but is really a displaced fragment of the base of the 5th metacarpal. When the base of the 5th metacarpal has a cut away appearance as shown, and this bone is found as drawn, a fracture and not an ulnare externum should be diagnosed. This case was followed from the time of the accident, when fragments had rough edges, till the time when the detached fragment became rounded off and looked like a perfect extra bone.

Fig. 5.—Os triangulare.

Fig. 6.—Fractured scaphoid. When a divided scaphoid is found in a developing hand, it may be admitted that a divided scaphoid does occur.

seen this bone in over 30 cases during the last thirteen years. (4) The internal sesamoid bone of the great toe may be in two or three parts and yet be normal. I have never found the external sesamoid of the great toe other than single. (5) The tibiale externum is fairly common. It occurs in about 10 per cent of cases examined. (6) Other bones of the foot seen

more rarely by x-rays are the secondary os calcis, the intermetatarsium, and the os vesalianum. The latter I have seen as an epiphysis, and only once in an adult. The fact that fracture occurs so frequently at the base of the 5th metatarsal bone makes it important to distinguish an os vesalianum from this fracture.

(7) Fracture of the os calcis should be ex-

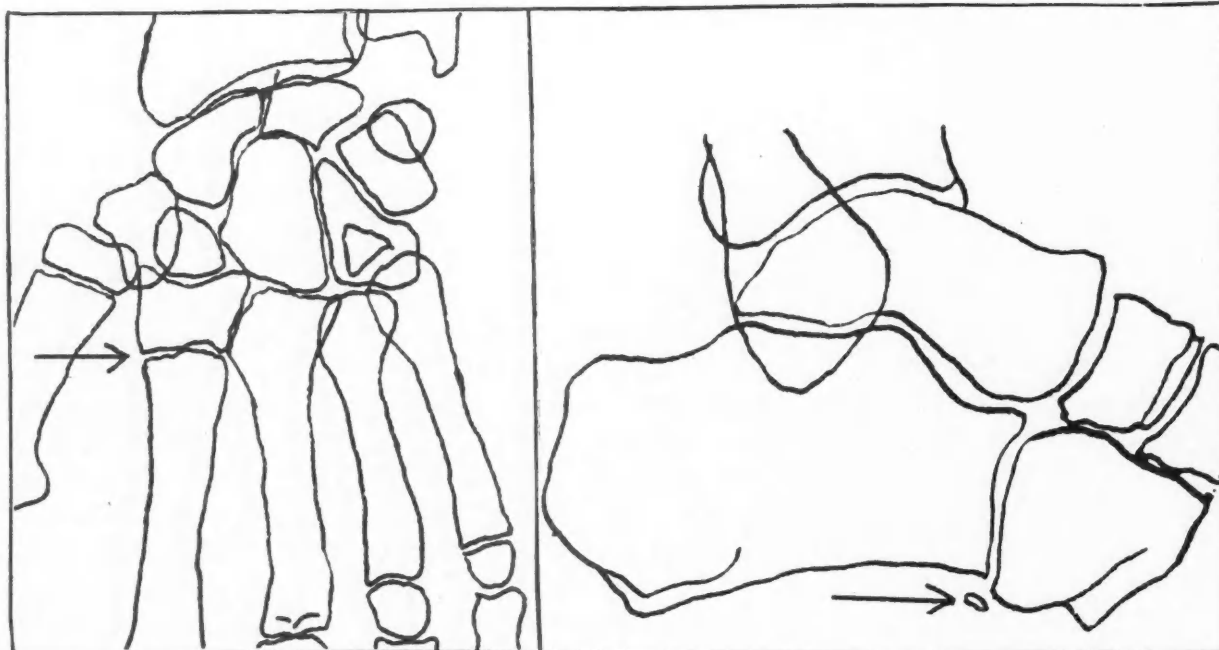


FIG. 7

FIG. 8

Fig. 7.—The seal epiphysis of the 2nd metacarpal. This is not very rare.

Fig. 8.—The os peroneum.

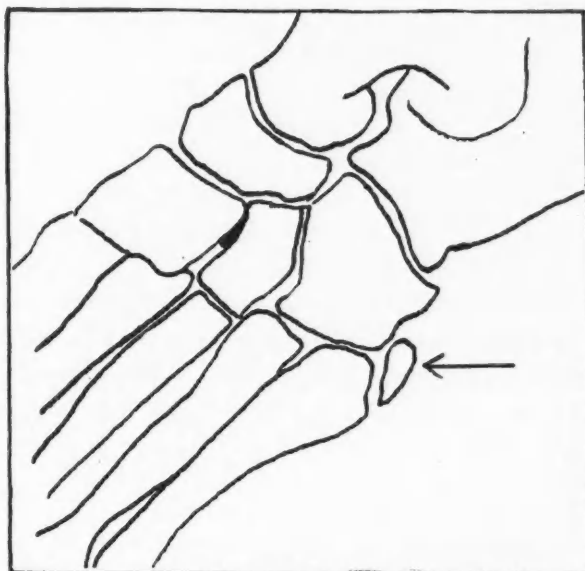


FIG. 9

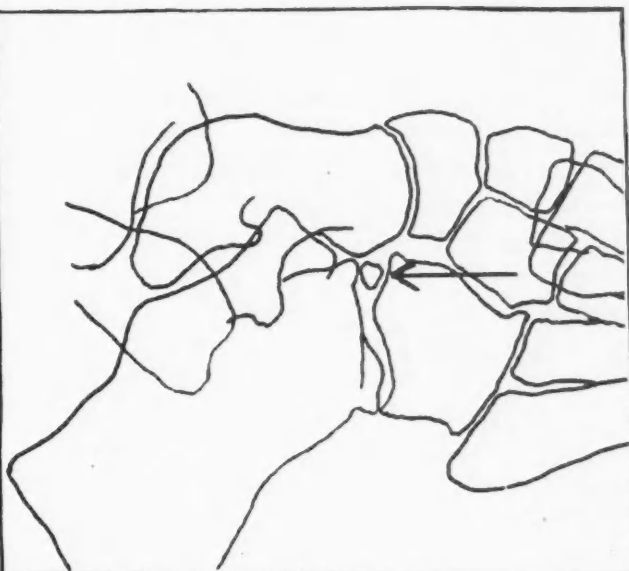


FIG. 10

Fig. 9.—Fracture at base of 5th metacarpal. This is not the os Vesalianum. The latter is present up to puberty and fused after puberty.

Fig. 10.—Secondary os calcis. Fairly common.

amined in three directions; for only one of the three directions may show the fracture. The lateral view may show fracture only by the want of proper arrangement of the trabeculae.

In regard to diagnosis of certain fractures it is well to bear in mind these points. A Potts' fracture and other fractures may be easily seen in one view and not in another; therefore at least two views at right angles should be made of every fracture. Fractured ribs may be invisible in one view and visible in another. The perfect examination for fractured ribs is three stereoscopic views of the chest on 14 x 17 films, one view anteroposterior, one at the half left position, and one at the half right position. The patella may develop in several parts and this condition simulates a fracture. I have seen three cases of this, and in each case the condition was present in both patellæ.

Fractures of the skull may similarly be only visible at certain angles. My routine examination for fractured skull is stereo right and stereo left views, an anteroposterior, and a postero-anterior view, six in all. Other views are made at times, such as a stereo of the foramen magnum and the surrounding bones. I have seen a fracture of the right parietal bone visible in the right stereo film, and invisible in the left stereo film. Meningeal artery grooves and diploic sinuses are so irregular in position and appearance that great experience is required to diagnose these from

a fracture. A few practical points of differentiation are as follows: (a) Meningeal grooves have white edges and fractures have not. This is only of value when the white edge is seen. (b) Fractures may branch like meningeal grooves. (c) A "meningeal groove" which does not begin at the base should be suspected as a fracture. (d) A diploic sinus may run in any direction, as may a fracture. (e) Fracture of the base of the skull is seldom seen by x-ray examination. It may be seen in a postero-anterior view in the base of the orbit or in a stereo view of the foramen magnum. (f) A fracture line may be narrower than a meningeal groove, and it may be wider than a diploic sinus. (g) A depressed fracture causes a white line, or a black and white line, while a simple fracture causes only a black line. A depressed fracture may also cause a wide black line.

Anomalies of the spine are very common. As pointed out by Cushway and Maier¹ in an analysis of 916 symptomless spines, anomalies were found in 45 per cent. No symptoms were present in cases of scoliosis, old fractured ribs, old fractured pelvis, old fractured vertebrae, spondylolistesis and sacralization.

Some other points of medico-legal interest may be mentioned here. Other conditions may be found along with a fracture, such as osteoarthritis, Paget's disease, calcareous vessels, periosteal thickening of lues, and these delay

the return of function. A negative x-ray may be as important as an x-ray of a positive fracture. Severe and permanent injury may occur in which x-rays show nothing. Both shoulders, knees, hands and feet, and hip joints should be taken as a routine; this involves little extra work and expense, but proves of great value in some cases.

Before giving your opinion in a medico-legal case consider the following points: X-ray evidence is only part evidence. The complete physical and symptomatic evidence and history make up the whole evidence. The roentgenologist has as much right to know the history of the case as the physician has. Even a pathologist demands information before giving an opinion. Be familiar with the clinical aspect of the case, and read or know the literature on the subject before giving evidence. An x-ray serves to prevent a malpraxis suit, and the want of an x-ray in a fracture case is considered malpraxis. It is not the duty of a roentgenologist to express an opinion on the amount of disability likely to follow a fracture by simply examining the roentgenogram.

An instructive and useful table showing the average number of days of disability following 3,254 fractures is given by Davis.² As an example from it, let me ask you—how long do you consider is the average disability following a fractured os calcis? Davis gives it as 118 days. He gives a fractured femur 208 days, a Colles' fracture 48 days, and so on throughout the series of common fractures.

Dr. M. H. Todd³ has analyzed 551 fractures at the Lynch Kentucky mines where the fractures have been followed to the final result. He concludes that return to light work is the best form of treatment, and is better than massage and diathermy. He found a remarkable difference in the speed of recovery depending upon whether or not the patient was injured as a compensation case. In his experience really serious disability following a fracture is very rare. The only exception is compression fracture of the spine where a little disability persists. He reports 47 fractures of the spine, of which 19 were com-

pression fractures of the 12th, or 1st or 2nd lumbar vertebra from the patient being bent violently double.

Pitfalls will be laid for you, but with good training and experience, a thorough study of the case and an honest opinion, no pitfall should catch you so long as you testify honestly in accordance with the facts. You should know not only the normal anatomy but also the normal variations. I remember a pitfall being prepared for me. It concerned a fracture of a cervical vertebra in a railway accident. The x-ray showed a small piece of bone detached from the 5th cervical vertebra. It measured 1/16th of an inch in the roentgenogram. The opposing counsel asked me if this was a small fracture, and I answered that it appeared to be so. He then cast doubt on my reply and asked me how small it was. I then saw his line of defence and that his object was to make me belittle the fracture. But I was on familiar ground and he was not, and I determined to lead him on instead of him leading me, so I answered "It seems to be about 1/8th inch long." He asked "Could it be any longer?", and I said "Yes, 1/4 inch." He led me on. "Any longer?", and I said "Yes, it might be 1/2 inch long." During this time he had been looking down towards his feet as though he did not care about the case, but at this point he pulled his gown around his shoulders and turning on me he asked "How long *could* it be, Doctor?" I said "About 3/4 inch but no longer." Triumphant he asked me to tell the court how a broken piece of bone 1/16th of an inch long could be 3/4 inch long. I had seen what was coming and had a match ready in my hand. I broke off three-quarters of an inch and held it up to the light showing how its shadow was three-quarters of an inch in one direction and 1/16th of an inch when seen endwise. I was asked to step down out of the box at once. I mention this merely to show how familiarity with your subject can give you confidence.

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GONOCOCCAL ENDOCARDITIS

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CASES of acute endocarditis occurring as a complication of gonorrhœa have been on record for the past eighty years or more. It has always seemed evident that the gonococcus was the cause of both conditions, but this was not definitely proved till thirty-five years ago, when the organism was cultured from the blood stream and from smears from the heart valves. This form of endocarditis is far from common, but is probably not so rare as is usually thought. In 1922, Thayer analyzed 176 cases of acute bacterial endocarditis in which the causative organism was definitely known. He states that 22 of these, a little over 11 per cent, were due to gonococcus. Judging from our experience here in Toronto and from reports from other parts of the world, this figure seems extraordinarily high. Perhaps the gonococcus of Baltimore is of a particularly aggressive kind.

Gonococcal endocarditis does not differ much from other forms of acute bacterial endocarditis, except that the outlook for life is rather better. On account of the scarcity of information, it is impossible to even guess at the mortality, but in the comparatively few case reports available there are at least six recoveries. Of two cases known to the writer, one recovered and one died. The incidence of the disease is described as being greatest among young adults, the majority occurring between the ages of twenty and forty. This is, of course, simply the age period in which gonorrhœa is most common. As would be expected, gonococcal endocarditis occurs most often in the more virulent types of gonorrhœa, where other complications are also present, such as epididymitis and arthritis.

The onset is usually characterized by fever, chills, sweating, palpitation, and a greater or less degree of prostration. In the cases that die the lesions found are those characteristic of any other malignant endocarditis, except that the vegetations and ulcerations tend to be particularly large. Any of the valves may be involved, most frequently the aortic, and in two of Thayer's cases, the aorta alone showed lesions

while the heart itself was free. Infarets, petechiæ and pericarditis are common.

The diagnosis is made, as in other forms of acute bacterial endocarditis, on signs of an acute general infection, such as fever, chills and prostration, with evidence of active involvement of the cardiovascular system. These might be new or changing murmurs in the heart, pericarditis, dilatation of the heart, or the occurrence of emboli in various parts of the body. The final proof of the diagnosis depends on the isolation of the organism from the blood stream or the heart valves, as has been done in a fair number of cases. As the gonococcus is notoriously difficult to culture, this final proof must often remain lacking. Actually, if acute endocarditis occurs in a patient suffering from gonorrhœa, and no other organism can be found, the presumption must be that it is a gonococcal endocarditis.

The treatment is, of course, most unsatisfactory, and is for the most part symptomatic. One procedure that should be of value is to watch carefully all cases of gonorrhœa for early signs of systemic infection. If any such are found, it is probable that complete rest in bed might halt their progress. A case reported from Paris in 1924 is of interest from the therapeutic standpoint. This patient was very seriously ill, and vaccine, uraformin, and electrargol were tried in turn without result. He was getting progressively worse, and death seemed certain when the use of an antigonococcic serum was instituted. He showed marked improvement almost at once, and eventually recovered completely. So far as could be discovered last year there is no such antigonococcic serum available here.

On account of the scarcity of information on this very serious complication of gonorrhœa, it was thought worth while to report two cases seen by the writer during the past year.

CASE 1

L. H. This was a professional man, 34 years of age, who, it may be said as a matter of interest, and incredible as it may seem, contracted gonorrhœa quite innocently. The urethral discharge began January 8th. It improved under treatment, but in about two weeks

both testicles became red, swollen and tender. On February 6th, arthritis appeared in knees, ankles, and shoulders, and he was admitted to hospital a few days later. Examination of the heart at this time showed a harsh mitral systolic murmur, but no enlargement. The patient was sweating profusely; there was a high fever; the spleen was not enlarged and there were no petechiae. The white blood cells were 14,000. This patient had had a careful chest examination a year previously and the heart had been found normal. During the next four weeks the high fever, chills and prostration persisted and became worse. Some questionable petechiae were found. The heart became faster and weaker, the

murmur louder, and dyspnoea more marked. Repeated blood cultures were sterile. Death occurred on March 7th, with the signs of a terminal bronchopneumonia.

Autopsy showed the pericardium and heart muscle to be apparently normal. The mitral valve, particularly the aortic cusp, had large rounded vegetations with roots spreading up the auricular endocardium for a distance of half an inch. The valve itself was perforated by an ulcer. Sections through the vegetations showed clumps of bacteria morphologically resembling the gonococcus.

CASE 2

A man of 24. The urethral discharge began January 14th. This improved gradually, but on February 25th the left testicle became swollen and the patient ran a typical course of epididymitis of moderate severity. Following this, he felt comparatively well until April 3rd, when he complained of pains in the arms, legs, and precordium. The heart was found to be normal in size, and there were no murmurs or other adventitious sounds.

April 5th.—The fever was increasing and there was sweating, pallor, and prostration. The heart had become definitely enlarged and there was a long soft mitral systolic murmur and a short aortic diastolic murmur.

April 7th.—Pain over the precordium was still present and there was a pericardial friction rub.

April 19th.—The temperature was down, the cardiac dullness was much enlarged, the heart sounds were muffled, and the friction rub had disappeared. Pericardial effusion was evidently present.

May 10th.—The patient's general condition was approaching normal. The effusion was gone, and the murmurs were unchanged.

September 15th.—The patient returned to Toronto for examination, after spending the latter part of the summer at work. There was a faint aortic diastolic murmur, and the blood pressure was 112/52, showing that a lesion of the valve aortic was still present. He was otherwise normal.

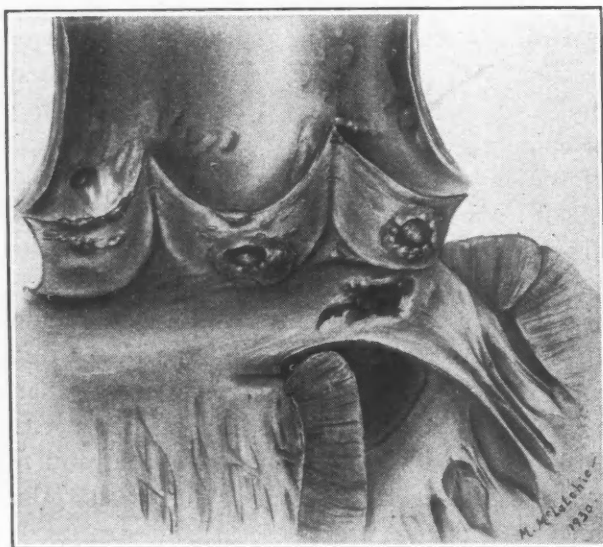


FIG. 1.—Showing perforation in mitral valve in Case 1.

Case Reports

A CASE OF PRIMARY ANGIO-ENDOTHELIOMA OF THE PUBIC BONE

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Malignant angio-endotheliomata of bone are extremely rare, only two cases having been reported by the Registry of Bone Sarcoma. Clinically, osteogenic sarcoma, and, histologically, secondary carcinoma are mistaken for angio-endothelioma of bone. This last occurs both in the old and young. The growth may be multiple or single. It may show complete washing-out of the bone shadow in the x-ray picture, or may be productive with the formation of new bone. As far as bone is concerned, there is not sufficient evidence to support a distinction between hæmangio-endothelioma and lymphangio-endothelioma.

The term endothelioma is applied to a large group of tumours which is believed to originate from lining cells of blood vessels, lymph channels, the subdural space or serous cavities. The peculiar intermediate position occupied morphologically by these endothelial cells, that is between epithelial cells and fibroblasts, determines the difficulty in recognizing the origin of these tumours. The endothelial cells in these tumours usually retain some of their characteristic features, upon which the nature of the growth may be based. In form they are polyhedral and often cylindrical, with relatively clear cytoplasm, containing a small, pale vesicular nucleus with multiple nucleoli. The epithelial cell, on the other hand, usually has a granular opaque cytoplasm with a prominent nucleus and large acidophilic nucleoli. Yet in some of these malignant tumours the characters of endothelial cells are not found and they resemble more those of embryonal epithelium. Vascular endothelium tends to be more cuboidal or cylindrical than the pavement type. The endothelial cells have

a more intimate attachment to the surrounding stroma which serves to distinguish them from epithelial cells.

One of the difficulties in diagnosing malignant angio-endothelioma of bone is the occurrence of confusing forms of metastatic tumours, such as a primary carcinoma of the kidney, which may closely resemble certain primary tumours of bone. Consequently, a diagnosis of endothelioma of bone should not be made until a thorough search for the primary growth has proved unsuccessful.

Endothelial cells occur normally in bone as lining cells of lymph and blood vessels, as perivascular endothelium, as sinus endothelium, and as cells of the lymphoid reticulum. The endothelial cells in any of these sites may assume neoplastic qualities. In such an event, the vascular endothelium exhibits angioblastic properties and gives rise to blood-vascular tumours or angio-endotheliomata, still maintaining to greater or lesser degree its ability to line blood channels, but without any tendency to new bone formation as a quality of the tumour cells. Kolodny¹ states "unless one can trace the origin of the tumour cells to vascular endothelium the diagnosis of malignant angio-endothelioma of bone is open to question."

The microscopic examination of these tumours, as reported by Kolodny², shows the cells to be arranged in alveoli and tubules resembling an adenomatous growth. These vary with the maturity of the tumour tissue. In young areas, the alveoli are small and completely filled with tumour cells. No lumina can be made out. The tumour cells are large, cylindrical, or polyhedral and have well defined cell membranes, pale vesicular nuclei and minute nucleoli. Later stages show lumina filled with circulating blood, and one of the most interesting features is the frequent lining of alveoli by a single row of tumour cells simulating vascular endothelium. In some cases, the tumour cells do not enclose blood, but form small cysts containing mucinous material. This may be followed subsequently by calcification, but this is rarely seen. A common feature is that the strands of tumour are intimately connected with the supporting stroma and are not separated from it by means of endothelial cells lining tissue spaces, as is always the case in metastatic carcinomata. Areas of well differentiated bone and of osteoid tissue may be seen throughout the tumour.

While endothelial cells have certain morphological characters in common, one cannot depend

entirely upon morphology to indicate the nature of the tumour cells, so that unless the tumour cell can be shown to arise from vascular endothelium, the diagnosis of angio-endothelioma is not secure

CASE REPORT

The specimen was obtained from a male patient, aged 65, who stated that in May, 1929, he was seized with sudden sharp shooting pains in the right groin. As his condition did not improve, he was admitted to hospital. Physical examination at this time was negative, including x-ray, Wassermann, and lumbar puncture investigations. Subsequent examination revealed the presence of a growth in the right pubes, ischium, ilium and femur. Further examination failed to reveal any growth in the bony skeleton elsewhere. An extensive search for primary carcinoma of viscera was negative.

Pathological report.—The specimen consisted of 3 oval pieces of tissue. The largest measured 1.5 by 1.5 by 1 cm. These were irregular in outline, pinkish-white in colour, somewhat granular in appearance, and firm in consistency. Their cut surface had a dense whitish, finely granular appearance, mottled with deep red hæmorrhagic areas. Two circular, flattened glands measuring 1.5 cm. in diameter by 0.5 cm. in thickness had also been removed. They were greyish-pink in colour and moderately firm in consistency. Their cut surface presented a moist, greyish-pink, slightly granular appearance.

Sections taken from the tumour in the body of the pubes showed, microscopically, marked replacement of the normal structure of the bone by large polyhedral, and at times, cylindrical, tumour cells, varying from 24μ to 35μ in diameter. These cells had a pale pink staining cytoplasm and a well defined cell membrane. The nuclei were placed slightly excentrically. Many were pale and vesicular, while others were hyperchromatic and slightly irregular in outline. Not a few of these cells contained two or more nuclei. Scattered throughout were numerous multinucleate cells which had a deeply staining cytoplasm and centrally placed nuclei. No mitotic figures were found in the sections studied. The tumour cells were arranged diffusely and in an adenomatous or tubular manner. (See Figures 1 and 2.) This alveolar arrangement was observed to represent blood vascular channels, lined by one or more layers of tumour cells. Some of these channels were of considerable size, containing red blood cells and tumour cells

within their lumina. The endothelial cells lining such channels varied from flattened to rounded and even cylindrical forms. It was possible to trace all gradations between the flattened and cylindrical forms. In some areas, the tumour cells were several layers deep, and in these areas the superficial cells were breaking away from their attachment and lay free within the lumen,

face of the bone, and the tumour cells had invaded the space between the periosteum and bone. (See Figure 3.) Many small trabeculae of osteoid tissue and bone were scattered throughout the tumour. Only an occasional small normal vascular channel was found throughout the area of tumour growth, which presented many large areas of necrosis. The remnants of

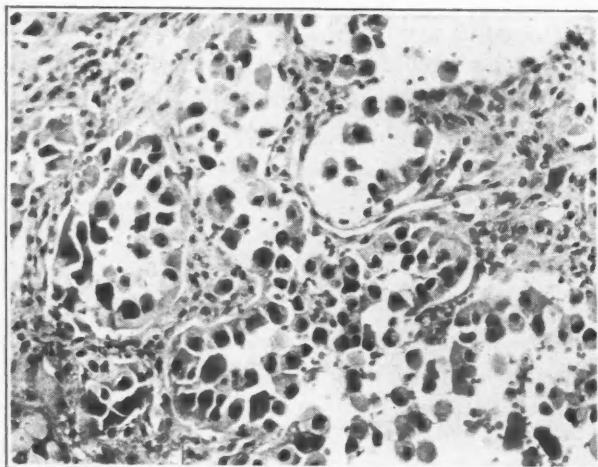


FIG. 1.—Angio-endothelioma of bone. Alveolar arrangement of the tumour cells.

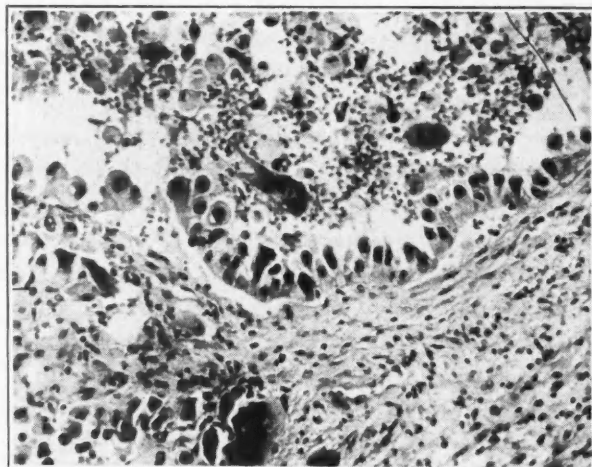


FIG. 2.—Angio-endothelioma of bone. Tumour cells lining the blood channels.

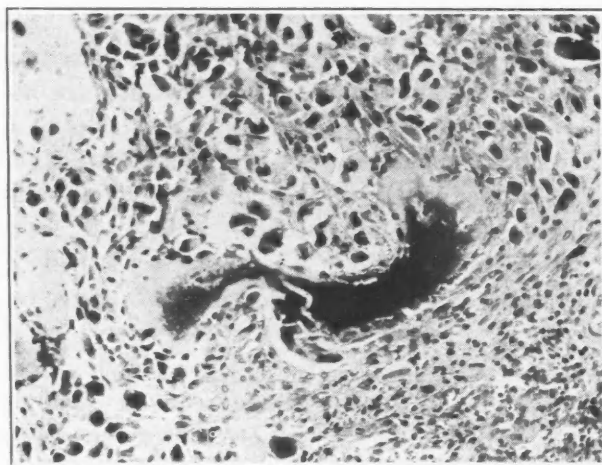


FIG. 3.—Angio-endothelioma of bone. Invasion of periosteum.

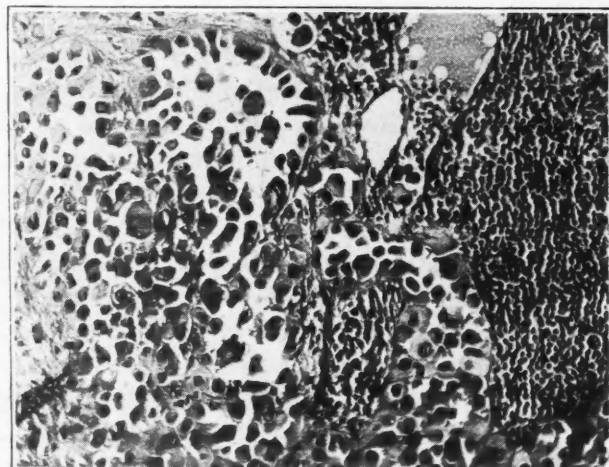


FIG. 4.—Angio-endothelioma of bone. Secondary growth in a lymph gland.

which, in addition to the mono-nucleated tumour cells, contained multinucleated cells as well. Other areas showed alveolar and tubular arrangements in which the lumen was completely occluded by tumour cells. The supporting stroma was scanty in amount and consisted chiefly of delicate fibrous connective-tissue septa, upon which the tumour cells lay. At the periphery of the tumour, however, where it was invading the periosteum, the stroma was more dense in character and was formed by recently proliferated fibrous connective-tissue cells. In this region, the periosteum had been stripped from the sur-

necrosed tumour cells and bony trabeculae could still be recognized in such areas. The nuclei in these necrosed areas no longer retained their staining characters, though fragments of pyknotic degenerating nuclei were numerous. The regional lymph glands were replaced in part by tumour growth, similar in all respects to the primary tumour, except that no bony trabeculae and no areas of tumour necrosis were observed. The greatest degree of involvement of the nodes was in their cortical portions. (See Figure 4.)

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EMPYEMA OF THE SUBDURAL SPACE*

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Acute suppurative processes confined to the subdural space form an infrequent but long recognized type of intracranial inflammation. The literature relating to the subject is largely limited to that of subdural abscess. In other reported cases, and the case herein given, the condition arose as a secondary or complicating feature of another disease process. In this instance, unlike the usual subdural abscess, no circumscribing adhesive response, or even localizing depression with marginal shelving of the underlying brain tissue, was present. This character of unobstructed diffuseness, together with the abundant thickness of the suppurative collection, occasions the designation "empyema of the subdural space". This term describes adequately and more precisely the condition found in this case.

These unusual pathological findings, which explain very well the puzzling clinical syndrome of an acute meningitis with a cloudy but persistently sterile spinal fluid, make the condition worthy of report.

CASE REPORT

R. P., a twenty-nine year old, ill-nourished, male, a rubber worker, entered the Toronto General Hospital January 30, 1931, complaining of frontal headache of six days' duration. On January 21st, the patient had had a head-cold and chill. Two days later his physician, called because of severe frontal headache and vomiting, noted the presence of nasal discharge and a puffy swelling of the forehead at the root of the nose. The patient's temperature at this time was 101°. Local treatment was instituted. The following day the patient felt improved and the local signs were much less apparent. However, the frontal headache returned, was persistent, and was accompanied by occasional nausea, vomiting and an irregular fever. On admission the patient's temperature was 101°, and the pulse 88. The patient was poorly nourished, markedly dehydrated, rest-

less, and at times irrational. A purulent discharge, which appeared to be coming from the right middle meatus, was present in the nasal cavities. The right frontal and maxillary sinuses were dull on transillumination. The pharynx was congested. Neurological examination disclosed slight stiffness of neck, a positive Kernig sign and hypertonic reflexes.

On the day after admission the patient was comatose. The temperature and pulse rose progressively. The spinal fluid remained cloudy and under increased pressure, death ensuing three days after entry to hospital.

Laboratory findings.—The blood leucocyte count was 18,000 per c.mm. The spinal fluid was cloudy and under a pressure of 20 mm. of mercury; the cell count, 8000, mostly polymorphonuclears. Numerous cultures on routine and special media and repeated smears of the spinal fluid, obtained at the bedside and from centrifuged fluid, were free from organisms in all instances.

Clinical diagnosis.—Acute meningitis; brain abscess (?).

Lumbar puncture was performed several times daily during the last three days of the patient's illness. The persistence of the same very liquid character and fine cloudiness of the spinal fluid was in striking contrast to the rapid thickening and yellow, opaque character of the spinal fluid so quickly obtained in the usual pyogenic meningitis. At no time was difficulty experienced in obtaining fluid through the puncture needle.

Post-mortem examination.—The dura externally and the longitudinal sinus were clear. On opening the dura, a great quantity of yellowish-green exudate, lying over the superior surfaces of both cerebral hemispheres, welled up. This exudate was very abundant over the anterior portions of both cerebral hemispheres, especially the right, and extended posteriorly, though in decreasing amount, to the occipital region. On the right side the veritable "cushion" of pus measured up to one-half an inch in thickness. On removing the brain from the cranium the same abundant exudate was found upon the antero-inferior aspects of both hemispheres, extending posteriorly about the optic chiasm, backwards to the pons. The posterior poles of the hemispheres, the tentorium, and the posterior fossa were free from pus.

The posterior plate of the right frontal sinus

* Published with the kind permission of Prof. Oskar Klotz.

presented a somewhat eroded, granular, yellowish-red area, measuring three-quarters of an inch in diameter, over which the dura formed a mounded pus-containing loculation. The dura over the summit of this small extradural abscess was shreddy and necrotic. Both lateral sinuses throughout their lengths contained greyish-pink purulent thrombi which were firmly attached to the intimal surfaces at some points.

On opening into the right frontal sinus a large amount of greenish-brown purulent material exuded. The sinus walls were covered with a yellowish-green exudate. Although no definite opening could be demonstrated in the right posterior frontal plate it was thinned out, translucent, and easily fragmented in the area adjacent to the extradural abscess. The right ethmoidal and sphenoidal sinuses contained small amounts of greenish, purulent material. The remaining bony sinuses and middle ear cavities were clear.

The gyri of the brain were somewhat flattened, and the sulci shallow over the superior aspects of the cerebral hemispheres. After removal of the subdural purulent accumulations the subarachnoid spaces were found to be free from demonstrable purulent exudate. The ventricular system and the subarachnoid spaces contained a slightly cloudy fluid. The underlying cortex was slightly injected and oedematous. The remainder of the brain examination was essentially negative.

Bacteriological examination of the exudate from the subdural space and from the frontal sinus revealed on direct smear a small Gram-negative bacillus and Gram-positive coccus in chains. On culture, *B. coli* and *S. hæmolyticus* were obtained in both instances.

Microscopic examination of dura and brain.—The dura over both hemispheres was markedly thickened by oedema and hyperplastic granulation tissue, which was diffusely infiltrated by lymphocytes and small numbers of leucocytes. Fragments from the tissue overlying the small extradural abscess of the right frontal region showed extensive necrosis of this membrane. Sections of the dura overlying the subdural exudate, at some distance from this point, showed only an irregular narrow margin of necrosis on the cerebral aspect. The purulent exudate was adherent to this necrotic layer.

Section of the cortex and pia-arachnoid

showed a thick purulent exudate overlying the latter membranes. The vessels in the pia-arachnoid and adjacent superficial brain tissue were congested. The subarachnoid spaces contained only a few polymorphonuclear leucocytes and slight amounts of fibrinous material.

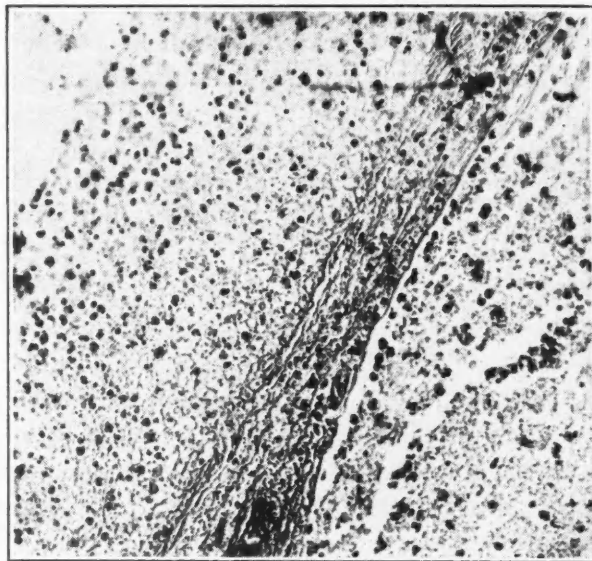


FIG. 1.—Fibrino-purulent exudate on the surface of the pia-arachnoid overlying the brain tissue.

The underlying brain tissue appeared somewhat granular and oedematous. The more remote brain substance was normal.

DISCUSSION

The dissemination of infection in this instance was found to pursue the following sequence. An acute osteomyelitis, associated with a suppurative sinusitis, gave rise to the small extradural abscess situated upon the posterior plate of the right frontal sinus. Following necrosis of the dura overlying the latter extension to the subdural space occurred.

Progressive intradural infection arising from without the dura eventually manifests itself as a leptomeningitis, brain abscess, or less frequently as a subdural abscess. The course of events which follows in these pathological conditions may be briefly stated. Once an extradural pyogenic infection is established, a fibrinous exudate quickly seals the underlying meninges over the inflammatory area. Further intradural extension, aside from vascular and perivascular metastases, is always preceded by secondary degenerative changes in this inflammatory barrier. MacEwen⁹ referred to this ability of the meninges to throw out a localiz-

ing plastic exudate and thus "stitch the intradural cleavage planes" as the "soldering" process. The great ease with which such a potential space as that between the dura and arachnoid layers could be barricaded, in contrast to the semi-patent sub-arachnoid meshwork, is apparent. MacEwen states that the low incidence of subdural suppuration among the secondary intracranial complications of extradural infection is attributable to the facility this anatomical arrangement lends to the "soldering" response.

When opportunity for the enveloping membranes thus to fortify themselves is not afforded, as in traumatic injuries, subdural infection is not infrequent. Likewise, it is striking how regularly this condition, as reported in the literature, has arisen following intracranial manipulation, (post-operative). The import of this circumscribing inflammatory reaction is further emphasized when one recalls the ready diffusion which occurs in non-inflammatory affections of the space, (traumatic hæmorrhage). In the event of subdural suppurations it is usually quickly localized. The same factors which discourage the initial infection tend to limit its dissemination. The resultant abscess is characterized by an adhesive inflammation delimiting its margins, and a well defined local depression of the underlying brain substance. No such confinement was exhibited in this instance. No local depression of the cortical surface was perceptible after careful removal of the exudate. It would seem that in this case, the circumscribing responses were outstripped by the rapid and excessive exudative accumulations, provoked by virulent and, moreover, mixed pyogenic organisms. The widespread and thick collection of exudate which resulted was the outstanding feature. It is felt that "empyema of the subdural space" adequately and appropriately describes the condition.

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A CASE OF LYMPHATIC LEUKÆMIA IN AN INFANT*

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Lymphatic leukæmia, while a comparatively common disease during the early years of life, is not particularly common under the age of two. At that period of life it is usually characterized by severe anæmia, acute hæmorrhagic involvement of the mouth and throat, a large spleen and a rapidly fatal termination, the so-called "bucco-pharyngeal syndrome". With this is a severe degree of anæmia, a colour-index of 1, immature white cells of the lymphatic and myeloid series in peripheral circulation, a progressively downward course and a rapidly fatal termination, usually within a period of days or weeks after coming under observation.

The case to be reported herewith differs from this recognized clinical picture in several points. Firstly, the length of the illness, four months; secondly, the peculiar blood picture showing very marked diminution in the platelet count, with a high percentage of reticulocytes; and, thirdly, the striking post-mortem findings.

Baby V. T., aged 16 months, was admitted to the Pædiatric Service of the Montreal General Hospital on November 22, 1930, with pallor, loss of weight and hernia.

Family history.—Irrelevant, the father and mother and one other child being well.

Personal history.—The child was born at the eighth month of pregnancy, weighing 4 lbs., was breast fed for six weeks, then went on to a milk, water and sugar mixture on which she did well. Aside from pallor the child was well and gained weight steadily until six weeks previously, when she suffered from diarrhœa and vomiting for a period of a week. After a period of starvation the child was apparently well but failed to gain in weight. From that time up to admission to hospital the parents noted that she was very pale, but did not appear lacking in energy or suffer from shortness of breath. Her appetite was good and the digestive functions normal, but she was very irritable and cried more than was her previous habit. There was no history of jaundice.

* Read at the Annual Meeting of the Canadian Society for the Study of Diseases of Children, Lucerne-Quebec, June 5, 1931.

Physical examination.—On admission to the hospital the child weighed 19½ lbs., was markedly pale and rather flabby; no icterus. Physical examination revealed considerable enlargement of the cervical lymph nodes, which were bean-sized, the axillary and lymph glands the size of small peas. The spleen was enlarged three fingerbreadths below the costal margin, with a firm edge, not hard, moveable, not tender. The liver was not palpable. The tuberculin reaction was negative, The Wassermann test was negative. Urinalysis was normal.

During her stay in hospital the child ran a constant temperature of 100 to 102 degrees, lost weight steadily, and showed increasing pallor, excepting after transfusions, when her colour would improve. Evidence of purpura was not noted until after the first transfusion, and after each subsequent one crops of purpuric spots over the limbs, face and body would appear within 24 hours of the operation and gradually fade. As being a possible source of infection, the adenoid was removed on February 17th, and this was followed by the first evidence of a hæmorrhagic diathesis, a transfusion being required to control the bleeding. After this there was a rapid course towards a lethal termination, which occurred March 4th.

Two days before death the child showed marked pallor, œdema of the face, and generalized purpura. The spleen had enlarged greatly during the stay in hospital and at that time occupied the whole left abdominal cavity, extending below the anterior superior spine and to the right of the umbilicus. The liver was enlarged three fingerbreadths below the costal margin; the superficial lymph nodes had enlarged in the neck to walnut size, to the size of large peas in the axillæ, inguinal and femoral regions. There was evidence of bilateral otitis media and bronchopneumonia. The blood picture is shown in the Table.

It is interesting to note that, while on admission the child showed evidence of a blood dyscrasia suggestive of Van Jaksch's anæmia, as shown by some enlargement of the epiphyses, blood phosphorus of 2.3, calcium of 9.3, there was no x-ray evidence of rickets, the epiphyseal lines being normal.

The first examination of the blood, made on November 27, 1930, by Dr. E. S. Mills, suggested to him lymphatic leukæmia. I quote Dr. Mills:

TABLE I

BLOOD PICTURES

	R.B.C.	W.B.C.	Hgb. %	Platelets	Reticu- locytes %
25/11/30 ..	2,800,000	13,000	40	56,000	12
1/12 ..	2,900,000	12,000	45	56,000	
9/12 ..	2,900,000	9,400	50	27,000	12
15/12 ..	3,300,000	7,500	56	21,000	10
23/12 ..	3,600,000	14,000	55	16,000	13
6/ 1/31 ..	3,100,000	19,000	56	18,000	13
23/ 1 ..	2,900,000	17,000	53	28,000	11
12/ 2 ..	2,200,000	11,450	56	16,000	20
20/ 2 ..	1,900,000	11,750	45	19,000	

SMEARS

	Myelo.	Mets.	Polys.	Bas.	Lymph.	Im. Lym.	Degen. forms
27/11 ..	8	6	14	1	44	23	4
15/12 ..	14	2	22		62		
23/12 ..	2	2	30	1	65	15	4
30/12 ..	11	6	13		51	37	
6/ 1 ..	4	4	12	1	42		
12/ 1 ..	19	4	19	1	56		17
23/ 1 ..	8		17		57		
12/ 2 ..	24	3	10	1	50		5
20/ 2 ..	1		19		80		

"This differential count was checked by means of a Goodpasture oxidase stain and it was found that 30 per cent of the cells were granular and 70 per cent non-granular, *i.e.*, 30 per cent bone marrow cells. Red blood cells show an advanced degree of basochromia, stippling and isocytosis, megaloblasts and normoblasts. This is either erythroblastic anæmia or lymphatic leukæmia, probably the latter."

On December 15th Dr. Mills noted that there was less disturbance of the bone marrow, while normoblasts were still seen, the red cells showing less stippling and basochromia. On January 23rd he noted much variation in the size and shape and staining of the red cells, many normoblasts, stippled cells and basochromic cells.

The early hæmatological diagnosis of the case was made not only on the blood picture of immature cells but also on the marked thrombocytopenia. The normal blood cholesterol ruled out Neimann's splenomegalia.

PATHOLOGICAL FINDINGS

The autopsy showed the spleen to be markedly enlarged, extending down to the brim of the pelvis and around into the anterior abdomen. The nodes in the mesentery were greatly enlarged, dark red grey in colour, showing numerous yellowish necrotic looking areas within their substance. These nodes showed recent hæmorrhage, which was also found in the bowel wall, particularly in the terminal ileum. The pericardial cavity showed evidence of an organizing pericarditis.

The liver and spleen were removed together with the pancreas, the organs being kept in their normal relationship; the liver was seen to be rather pale red, capsule smooth and glistening on section, tissues rather moist, and detail not disturbed. In its substance one or two small yellowish areas were seen which suggested deposits of leukæmic cells. The gall bladder was small and empty. The spleen was tremendously enlarged, occupying the whole of the left aspect of abdominal cavity and reaching to the crest of the ileum. It was approximately five times the size of the normal adult spleen and was quite firm. There was a great deal of perisplenitis, the spleen being intimately attached to the under surface of the left lobe of the liver, to the diaphragm, and to the peritoneum in the flank. In removing it from its bed many adhesions were cut and broken. The surface of the spleen presented a very unusual picture. The general colour was a rather dull reddish brown, but diffusely scattered over the main anterior and outer surfaces were seen a number of yellow nodules lying within splenic substance. Most of them were distinctly separate but some were almost confluent. The tissue in the nodules was soft, yellow and appeared almost caseous. While a first glance suggested tuberculosis, the case being obviously a leukæmia, these nodules were interpreted as being collections of lymphatic cells within splenic tissue. On section of the spleen, the pulp was quite firm and scattered diffusely through it were seen similar yellow deposits. The pancreas was quite normal in appearance, but along its superior and inferior margins were great masses of enlarged, firm, injected lymph glands similar to those seen in the mesentery. These organs together with the stomach were removed together and fixed.

The brain was of normal size, very pale and anæmic; no evidence of meningitis. On the external surface of the dura were several areas of thickening, which were very hæmorrhagic and simulated young granulation tissue. These areas were seen over the dome of the skull. In the inner table of the skull opposite these the bone was destroyed and somewhat worm-eaten, which gave it a rough, granular, red appearance. This undoubtedly represented an area of chronic pachymeningitis externa with pressure atrophy of the adjoining skull.

Microscopic examination.—*Liver.* Sections throughout showed a diffuse infiltration with

white blood cells, chiefly of the large mononuclear lymphocytic series. These cells were seen in great numbers, filling the vascular radicals throughout the liver and making these appear very prominent. In places there were foci in which there was an absolute replacement of liver substance by great accumulations of white blood cells and in these collections polymorphonuclears were prominent. The picture was that of abscess formation. The blood vessels everywhere showed a great increase in the white blood cells. The most striking point was the predominance of large lymphocytes. In the periportal connective tissue were foci of infiltrating cells. The cells, in contrast to the foci in the lobules, were of the large mononuclear series of lymphocytes, with a few mononuclear eosinophiles. There was no increase in the connective tissue. The liver cells proper appeared a little swollen and indistinct. Accumulation of lymphocytes was especially noticeable just beneath the liver capsule.

Spleen.—Sections of the spleen showed on the outer aspect of the capsule a layer of fibrin in which were enmeshed numerous large lymphocytes and polymorphonuclears. The splenic corpuscles were very few in number through the sections. Trabeculæ and connective tissue were not prominent; the follicles were scanty; the intervening tissue presented a diffuse infiltration with mononuclear cells and small lymphocytes and, in places, circumscribed foci were seen in which polymorphonuclears were much more abundant and in which the splenic architecture was destroyed—areas of acute degeneration. These corresponded to the pale areas noted in the gross and here, as elsewhere, represented acute terminal changes. They were no doubt secondary, the result of the leukæmia, but had etiological relation to it.

Nodes along the pancreas.—There was, apparently, an increase in connective tissue through the pulp of the gland. The follicles appeared to be normal. In the pulp there were great numbers of large eosinophilic myelocytes, endothelial cells and lymphocytes, but only a rare polymorphonuclear cell. Some of the peritoneal nodes showed almost complete replacement of the normal elements with large lymphocytes. The peripheral sinuses were distended with white cells. Here, as elsewhere, large lymphocytes predominated.

Dura.—Section of dura showed on the outer

surface a rather thick layer of fibrin which appeared to be laid down somewhat in layers and in which great numbers of red blood cells were seen. Scattered through this were many lymphocytes, mononuclears and an occasional polymorphonuclear.

SUMMARY

A case of lymphatic leukæmia of four months'

duration in an infant of sixteen months is reported. The blood picture showed severe anæmia, a very slight leukocytosis, marked thrombocytopenia and the constant presence of myelocytes and reticulocytes in the peripheral blood.

An unusually large spleen, with evidence of severe focal necrosis, was found at autopsy, and a marked degree of pachymeningitis externa.

Editorial

AGRANULOCYTOSIS AND HYPOGRANULOCYTOSIS

THE affection known as agranulocytosis, though in many cases hypogranulocytosis is the more correct designation, is one of the most peculiar and baffling that we meet. Judging by the records, it is rather uncommon, yet it is safe to say that if in certain cases, the type of which may be judged from what is to follow, a blood examination were the rule the diagnosis of agranulocytosis would be made more often than it is.

Agranulocytosis was first described as a definite clinical entity by W. Schultz in 1922¹. The outstanding symptoms and signs are prostration, fever, and ulceration of the tonsils and pharynx. The lymph-nodes, spleen and liver are not affected. Jaundice is a not infrequent accompaniment. About 80 per cent of the cases occur in women, usually about middle age, and the outcome is commonly death. The diagnosis lies, in the main, in the examination of the blood, which manifests leucopenia, with a notable or complete diminution in the number of the granular type of leucocyte, polymorphonuclears, eosinophils, and basophils alike. Similarly, it is found that the granular cells have disappeared from the active bone marrow. There is little or no diminution of the red cells of the circulating blood or of the platelets, and the erythroblastic tissues are unaffected. Also, there is no change in the bleeding or coagulation times.

Since the publication of Schultz's first monograph other similar cases have been placed on record, some of which diverge in

certain particulars from the pure type described by him. Aubertin and Levy² have pointed out that severe anæmia affecting the red corpuscles may occur, and also the hæmorrhagic diathesis. Ulceration is not confined to the buccal cavity but may be found in the larynx and on the genitalia.

Benhamou³ says, also, that even in "pure" agranulocytosis the leucopenia mentioned by Schultz need not be present, cases having been reported in which the white cells reached 10,000 per cubic millimetre or more, though, even so, the cells have been almost wholly mononuclear. All this tends to make the subject particularly difficult, for thereby is opened up the question as to how much or how little should be included under the term "agranulocytosis" of Schultz.

The etiology of the disease is still far from clear. Schultz thought that the probable cause was a micro-organism or some other toxic agent, but so far no specific germ has been definitely incriminated. In several instances *B. pyocyaneus* has been recovered from the throat and in at least one (Mackeen⁴) from the blood, which is suggestive, so far as it goes. On this point it may be stated that, on occasion, very intense septic infections have been known to cause leucopenia with an absolute or relative lymphocytosis. Thus, Türk⁵ has recorded a case of peritonitis with a leucocyte count of 900 cells, of which 780 were lymphocytes. Why this should be we do not know. Türk himself

1. SCHULTZ, Commun. to Verein für innere Med.u. Kinderh., July 3rd, 1922.

2. AUBERTIN AND LEVY, Arch. mal. du cœur, 1928, 2: 369.

3. BENHAMOU, Ann. de Méd., 1930, 27: 165.

4. MACKEEN, Can. Med. Ass. J., 1931, 24: 424.

5. TÜRK, Wiener klin.Wchnschr., 1907, 20: 17.

thought that such lymphocytic reactions might be due to some unusual constitutional disposition towards acute infection on the part of the patient. This cannot be the complete or only explanation, however, for Gooding⁶ notes that in two cases of glandular fever (in which there is lymphocytosis), when acute septic infection supervened, the bone marrow reacted according to precedent by producing a polymorphonuclear leucocytosis. It may be inferred from this that certain poisons of bacterial origin may exert a selective inhibiting action upon the formation of the granule-bearing cells by the bone marrow, while others stimulate it.

Furthermore, a picture analogous to that of agranulocytosis has been met with as a result of poisoning with certain definite chemical substances, notably, arsenobenzol, bismuth, and trinitrotoluol. Some discussion has taken place as to whether in the case of arsenobenzol poisoning the effect is due to the arsenic or to the benzol, but in view of what we have learned about the action of benzol on the bone marrow it would seem reasonable to incriminate the latter. Aubertin and Levy⁷ are inclined to blame the benzol moiety, but call attention to the fact that at least one case of agranulocytosis has occurred in a person suffering from untreated syphilis. They therefore think that syphilis may be a predisposing cause by rendering the bone marrow more susceptible to toxic influences. Benhamou (*loc. cit.*) admits the etiological relationship of divers toxic agents, but thinks that they are effective only if there is an innate susceptibility of the hæmatogenic system in their direction, in other words, a diathesis. A number of cases, too, are on record which seem to prove that the application of x-rays or radium can, on occasion, produce the blood picture of agranulocytosis or aplastic anæmia, for information on which subject the reader is referred to a critical review by Sir Humphry Rolleston, entitled "The Harmful Effects of Irradiation (X-rays and Radium)"⁸.

Admitting all this, we are still left with a series of cases in which there is no obvious cause to be invoked, though even in these we may infer that, in a general way, some

poison up to the present unknown acts detrimentally, but specifically, on that part of the hæmatopoietic system concerned with the production of granulocytes. It would seem logical, therefore, to divide the cases of agranulocytosis into two groups—primary or idiopathic (pure type of Schultz) and secondary or symptomatic.

That there is a deficiency in the power of the bone marrow to produce granulocytes is an assumption that seems warranted from the available post-mortem evidence. Connor, Margolis, Berkeland and Sharp⁹ report four autopsies on cases of agranulocytosis in which well marked aplasia of the bone marrow, almost complete absence of cells of the myeloid series, and little or no proliferation of the granular cells, were the outstanding features. Where there was necrosis or ulceration it was noteworthy that the tissues in the neighbourhood showed no infiltration with polymorphonuclear leucocytes, the cellular reaction found being lymphocytic and endothelial. In all cases there was evidence of an infection to which resistance was slight. It may be added that additional support for the contention that in agranulocytosis the granulocytopoietic function of the bone marrow is destroyed or inhibited is to be found in the fact that in the cases with leucopenia the total leucocyte count may be raised to 10,000 or more by the injection of adrenalin, as Gibson¹⁰ has shown, yet the added cells are all mononuclears.

The diagnosis of agranulocytosis is fraught with difficulties, but a careful examination of the cellular formula of the blood will clear up most doubtful cases. The fever and toxæmia may at times suggest typhoid fever or pneumonia and other febrile disorders. Here the response to adrenalin will be helpful. In typhoid fever it is rare to find ulceration of the tonsils or pharynx, and the lymphocytosis present is only moderate. A positive Widal test would assist. The course of the two diseases is, of course, quite different. In pneumonia, apart from the physical changes in the lung, there is a polymorphonuclear leucocytosis, except in the terminal stages.

The appearance of papules or vesicles on

6. GOODING, *Practitioner*, 1931, 127: 468.

7. AUBERTIN AND LEVY, *Ann. de Méd.*, 1930, 27: 151.

8. ROLLESTON, *Quart. J. Med.*, 1930, 23: 101.

9. CONNOR, MARGOLIS, BERKELAND AND SHARP, *Proc. Staff Meet. Mayo Clinic*, 1931, 6: 193.

10. GIBSON, *The Lancet*, 1926, 2: 948.

the skin and mucous membranes may simulate pemphigus, varicella, and small-pox. Here, again, a blood examination is the crucial test. In pemphigus eosinophilia is present and may be marked; in varicella the differential leucocyte count may be unaltered; there may be slight polymorphonuclear leucocytosis; any lymphocytosis is slight and of late occurrence. In small-pox there is a polymorphonuclear leucocytosis.

The most deceptive conditions are, of course, those associated with inflammation of the fauces. Such are Vincent's angina, diphtheria, leukæmia, including the so-called aleukæmic leukæmia, and acute infective mononucleosis (glandular fever). In Vincent's angina the characteristic fusiform bacilli and spirilla (*Borellia Vincenti*) are found, and there is cervical adenitis. In diphtheria the specific bacilli can be found, and there is usually a response to antitoxin. There is a moderate polymorphonuclear leucocytosis, except in very mild and very severe cases. Acute infectious mononucleosis usually occurs in children and young adults and is associated with enlargement of the lymph-nodes. In it there is a moderate leucocytosis, with increase to 75 or 80 per

cent of the lymphocytes. Moreover, the inflammation of the throat is usually mild. Recovery is the rule. The diagnosis from leukæmia will usually be easy on the basis of the blood picture, as in this disease pathological blood cells are found. Only in the aberrant forms, when leucocytosis is in abeyance, and in the aleukæmic form, will there be difficulty. Probably a diagnosis cannot properly be made in this case in the absence of an examination of the bone marrow.

When hæmorrhagic manifestations occur, with diminution of the platelets, the picture, both clinical and hæmatological, is identical with the "aleukia" of Frank and with aplastic anæmia.

A plea is made for more frequent blood examinations in the clinical types referred to above. This would probably show that agranulocytosis is not so uncommon in Canada as we are apt to think. Already a few cases have been reported in our *Journal*^{11,12,13}.

A. G. N.

11. PRENDERGAST, *Can. Med. Ass. J.*, 1927, 17: 446.

12. JACOBSEN, *Ibid.*, 1930, 22: 814.

13. MACKEE, *Ibid.*, loc. cit.

HOSPITALS AND THE COMING YEAR

THIS last year has not been an easy year for our hospitals. Many of their usual difficulties have been intensified by the current depression and many readjustments necessitated by the steady evolution of hospital service have been necessary. These conditions bid fair to be continued during the present year. Hospitals are reporting that their public ward services are crowded, while their private accommodation in many instances is poorly patronized. This has lowered their income considerably. Collections are slower, particularly in the stricken areas, where many hospitals are on the point of bankruptcy. The percentage of unoccupied beds has risen during the last year and is expected to so continue this year, although the decreased stamina of the unemployed, the increased financial worry of many, and the tendency to put off the less acute surgical work may result in greater demands upon the hospitals in the near

future. The very active building program of 1927-1930 dropped off considerably last year and is likely to remain so during the present year, although a number of ambitious programs are now under way. Those hospitals which can build at the present time are fortunate, for building costs are down and architects are noting already a swing back toward higher costs.

There has been a general pruning of expenditures and this is likely to continue for some time to come. With decreased fees and municipalities protesting payments for indigents, hospitals are trying to get along with a decreased personnel and as small a maintenance budget as possible. While the frequent press criticism of hospital costs reveals a remarkable lack of knowledge of hospital finance on the part of the critics, such criticism has been of some value, for it has stimulated increased interest in more economical hospital design and administra-

tion, and has hastened the development of more equitable methods of payment for hospital services. Without doubt this movement will become more widespread during the next few years.

Hospital workers are realizing more and more that the community hospital must become a community health centre. Many hospitals which have never had an outpatient department are planning such a development now, and several of these will be opened this year. Those hospitals with outpatient departments are planning, in many instances, a further elaboration in the facilities and services offered. The medical staffs are cooperating more than ever in the general activities of their hospitals; interest in staff meetings and clinical research is greater than ever before. The standardization movement has given a marked impetus to hospital improvement and the recent action of the Canadian Medical Association in taking over for Canada the approval of hospitals for internship should increase the number of internships being taken in Canada, thus materially improving the hospital services. The increased dependence upon the radiological and the pathological departments has resulted in a wide development of

these services, and many of the hospitals, especially the smaller ones, are now faced with an inability to finance the employment of adequately trained directors and technicians. Incidentally the smaller hospitals with training schools are much perturbed over the nursing situation, and there is general apprehension that the small training schools may soon be reduced in number. Much of this apprehension is based upon ill-founded rumours; nevertheless, the report of the joint Survey Committee on Nursing Education will be awaited with much interest.

Despite the many difficulties facing our hospitals they are in a fortunate position. They have the confidence of the people as never before. Hospital legislation is improving slowly but surely; hospitals have an unexcelled opportunity to participate in our health program; their staffs, medical nursing and lay, are the envy of other countries. Their provincial and other associations were never so active, and the new Canadian Hospital Council should be a strong inspiring force. The hospitals are facing this year with renewed confidence.

G. HARVEY AGNEW.

A SURVEY ON THE WORK OF THE VICTORIAN ORDER OF NURSES

EARLY in 1930 the Executive Council of the Victorian Order of Nurses decided that it would be in the best interests of the Order to have an impartial survey made of its activities, in order that it might receive advice "in so far as medical direction of policy is concerned and from the public health viewpoint, so that, working in proper relationship to the medical profession and health authorities throughout the country, the Victorian Order may be in a position constantly to improve its service." To this end the Order applied to the Canadian Medical Association for consultant advice, and that body expressed its willingness to cooperate in the manner desired and suggested that Dr. Grant Fleming, one of its Associate Secretaries, be appointed to conduct the work. This suggestion met with the approval of the Order and at the end of May in the same year Doctor Fleming took

over his allotted task. His report is now before us, and, as we would expect, is characterized by a thorough grasp of the situation, comprehensiveness, and helpful suggestion. Its main features only can be reviewed here, but the complete report well deserves study.

In brief, it may be stated that the objects of the Victorian Order of Nurses are to establish and maintain a visiting nursing service in Canada, to demonstrate nursing methods, to assist in training nurses for public health nursing, and to aid in the maintenance of health and the prevention of disease. From its inception in 1897 the Order has grown. A staff of sixteen nurses in 1898 has increased to more than three hundred in 1930. It is worthy of record that some twenty-four cottage hospitals were established by the Order in districts where the population was so scattered that it could not be served by visiting nurses.

All these hospitals have been handed over to the respective local authorities, and the Order is said not to be contemplating any further activity in this direction. This in itself is a notable accomplishment.

At the present time, with its eighty-two Local Associations, the beneficent work of the Order is available for about one-third of the population. Nursing care is provided for about six per cent of the maternity cases in Canada, and the groups served by the Order are undoubtedly better off than those not so cared for. For example, the death rate among recent mothers under the care of the Order in 1929 was only one-third of that for the Dominion as a whole, and the death rate for the infants, during their first month of life, was only half that for the Dominion as a whole. This alone justifies the existence of the Victorian Order of Nurses, and Doctor Fleming presses the point home that the Order should extend its services, particularly to mothers and infants, until they are made available to every person in Canada who is in need of such assistance. Furthermore, there is an increasing demand on the part of those who are both able and willing to pay for nursing service of the type supplied by the Order, and there seems no good reason why the service already provided for the indigent should not be extended to meet this demand. Could this be done, it would go some distance towards reducing the cost of medical care, which at present is bearing heavily on certain classes of our people.

Doctor Fleming points out that the Victorian Order of Nurses is a voluntary health organization and, therefore, should take an active interest and give leadership in promoting health work. He recommends, to further this object, that a new division of Local Associations be created under the supervision of a medical man attached to the central or National Office.

In Doctor Fleming's opinion some form of Health Insurance is almost certain to be established in the various provinces of Canada before long which will likely include a visiting house nursing service. The Victorian Order of Nurses must face this situation and be prepared to meet the requirements, otherwise it may find eventually that its usefulness as an Order has departed. At

the present time it has the advantage of being an organized body, meeting a definite want, and only needing to be developed and expanded.

One learns with some surprise that the Victorian Order of Nurses is not well known, either among the general public or among the medical practitioners. Of course, if Doctor Fleming says so it is so, and the Order is, therefore, well advised to take steps to remedy this state of affairs. Apparently the medical men in some parts of the country either do not know that such a nursing organization exists, or they are not seized of its importance, or, again, it may be that the people in their districts lack the initiative to set about the establishment of Local Branches. Publicity relating to the work of the Order is clearly required, and the suggestion is made that special lectures and demonstrations should be given before the various medical societies of the country and before classes of medical students so that the medical profession would become conversant with the work of the Order and the benefits which are available for those who are willing to reach out for them. The general public could be reached through health talks and demonstrations, the radio, and the daily newspaper.

A strong argument is put up in the report of the Survey for a closer linking of the Local Associations with the Central or National Office. The Local Associations must, of course, still remain responsible for providing adequate nursing service in their particular districts, but if the Order is to maintain its existence there must be a strong central coordinating Office directing the whole. The Local Associations are well advised to consider placing more power and authority in the National Office. Among other duties, the National Office should keep in touch with provincial legislation and investigations.

The growth of the Order at the present time is unduly slow; it has not kept pace with the growth of the country. The program calls for progressive expansion, with the end in view that the scope of the Order will become nation-wide, including service to the French-speaking population, but, we presume, to all nationalities. This will cost much money, but it is not unreasonable to

ask that the Federal Government contribute to the cost of a maternity nursing service for those unable to pay for it, and that the Provincial and Municipal authorities contribute towards the cost of a visiting nurse service to the indigent in their own homes.

It is satisfactory to learn that the Committee of the Order appointed to study and report on this Survey in the main agrees with its recommendations. The chief point on which they differ is that in which the creation of a Division of Local Associations, with a Medical Field Secretary in charge, is recommended. The Committee feel that the desired end might be accomplished, without cost and complications, through existing agencies, such as the Education and Publicity Division, the Board Members' Manual, and the visits to the different areas of the Supervisor and Chief Superintendent. Other differences, of a minor character, have

to do with the means by which certain of the recommendations can be best implemented.

One feels that this Survey is a splendid piece of work, thoroughly done, and that, if it be acted on, the Victorian Order of Nurses should take on a new lease of life, and be of greater service to the country than ever before. It is not expected, of course, that all the recommendations, even if adopted, can be put into effect at once. They are, indeed, likely to be more lasting if put into operation gradually. Then, they can be fairly tested. In the meantime we shall follow with interest the fortunes of this splendid organization. We hope it may rise to its opportunities; we hope it will gain its objective; we hope it will gain an even greater meed of appreciation than in the past from the medical profession and the people at large. The Dominion of Canada has need of the Victorian Order of Nurses.

A. G. N.

Editorial Comments

The Middle-Rate Plan for Hospital Patients

While the high cost of living is in most places a topic for merely academic discussion, the Massachusetts General Hospital in Boston has met the problem in a practical fashion by providing private and semi-private rooms for patients of moderate means in its Baker Memorial Pavilion. Dr. Rufus Rorem, in the year's report, gives the following facts.

During the first year's operation nearly 2,500 patients were treated, representing the lower-salaried professional groups, "white-collar" members of business groups, artisans, and elderly persons living on small incomes. The average family income was \$2,500. In accepting patients, consideration is given by the hospital's admitting officer to their family income, savings, debts and obligations, expenses for past illnesses, the probability of the patient's complete recovery, or possibility of his future dependence, and the probable length of time before he will again be able to earn money, if his income stopped because of his illness.

A distinctive feature of the middle-rate plan is that the patient receives only one bill, which includes the doctor's and all other charges. Room charges, including usual medicines and regular nursing service, are from \$4 to \$6.50 a day. Physicians and surgeons on the staff of the Massachusetts General Hospital have established a moderate schedule of fees for patients treated in this pavilion, and have further agreed

that the maximum professional charge to any one patient is \$150, no matter what the length or complexity of his illness.

Special nursing, required only in exceptional cases, is furnished at the rate of \$6 a day, and \$1.50 for the nurse's room and board. Flat rates cover the usual laboratory and other special fees, while unusual services and drugs are provided at cost price. All items are included in the bill rendered to the patient by the hospital, with provision for payment by instalments if necessary. The hospital collects the whole bill and turns over the agreed fee to the physician who has been in charge of the patient.

This plan has been designed to meet the needs of patients who cannot pay the costs of charges and fees in the private room pavilion of the hospital, yet who are able and anxious to pay their sickness bills on an independent basis, rather than accept care in a ward where the patient's payments cover only half the hospital's costs and where the doctors receive no remuneration. Payments by patients to physicians during the year were approximately \$147,000. While a few of these 2,500 patients might have found it possible to obtain care in the regular private room service, the majority would have been obliged to seek ward service had not the middle-rate plan been in operation, and the physician would then have received no fee at all.

The total costs paid by the patients for their illnesses averaged \$173; the average length of stay in the hospital was 13 days. The average

was made higher by a few instances of very prolonged illness; one required more than six months' care and a bill of \$1,769. Fully half the illnesses cost not over \$118. The care of a hospitalized illness must be regarded as a major item in the expenses of the fiscal period in which it occurs. Any device which can limit the necessary costs must be considered important.

LILLIAN A. CHASE

**Sir David Bruce, K.C.B., D.Sc., LL.D., M.B.,
F.R.C.P., F.R.S.**

Sir David Bruce, the world-famous parasitologist, died on November 27, 1931, after a lingering illness. His death took place a few days after that of his talented wife, and while her funeral obsequies were being held. By his death the world is the poorer for the loss of one who was a pioneer in the science of parasitology, one gifted with vision and great common sense, one whose work never needed correction.

Sir David Bruce was born at Melbourne on May 29, 1855, and educated at Stirling High School and Edinburgh University, graduating M.B., C.M. in 1881. Two years later, he entered the Army Medical Service and served in Malta and Egypt until 1889. While in Malta he discovered the bacillus responsible for Mediterranean fever and traced the disease to the use of milk from goats harbouring the organism. Since then the discovery of related organisms in the case of contagious abortion in cattle has led to the separation of a special group which now goes under the generic name of *Brucella*. In his work on Mediterranean fever, and indeed all through his scientific career, Bruce was greatly aided by his wife, Mary Elizabeth Steele, R.R.C., O.B.E., whom he married in 1883. Bruce, it is said, was not a good technician, but in all kinds of microscopical and laboratory technique Lady Bruce was supreme. Consequently, for the elucidation of difficult research problems connected with tropical disease, Sir David, with his gift of intuition and his constructive imagination, and Lady Bruce, with her technical ability, made an ideal team. In fact, Lady Bruce should be included with her husband among the immortals.

From 1889 to 1894 Bruce held the post of Assistant Professor of Pathology in the Army Medical School at Netley. Then he went to South Africa, where he remained seven years, serving through the South African War with brilliance. He was specially promoted to be Lieut.-Colonel in 1900. In succeeding years he was a member of various commissions detailed to study cholera, Mediterranean fever, dysentery, and sleeping-sickness. He became colonel and was specially promoted to be surgeon-general in 1912 for his scientific services.

It is, however, on Bruce's study of trypano-

somiasis that his chief fame will rest. David Livingstone had described "tsetse fly disease" many years before. It was the disease that most hampered the work of all the early explorers in Africa. Then, in 1880, in India, Evans had shown that a trypanosome was the cause of the disease found in beasts of burden, known as "surra". In 1895 Bruce was asked by the Governor of Natal to investigate the tsetse-fly disease of Zululand, or, as it was called, "nagana." He found that nagana was found in all domestic animals and proved that the tsetse-fly (*Glossina morsitans*) which transmitted the disease was the carrier of a living organism. He sent an infected dog to England and in it Plimmer and Bradford found an organism which they called *Trypanosoma brucei*. Bruce then discovered that the wild animals of the jungle could harbour the organism without showing obvious signs, and made it evident that they were the reservoir of infection. In 1902, Castellani, a member of a commission appointed by the Royal Society, discovered a trypanosome in the cerebrospinal fluid of certain patients suffering from sleeping-sickness, and Bruce was asked to assist in the investigation. It was subsequently discovered that the trypanosome was demonstrable in every case. Eventually it was determined that *Glossina palpalis*, a fly related to *G. morsitans*, was the special insect vector. Later investigation showed that the human trypanosomiasis of Nyasaland was not due to *T. gambiense* but to *T. rhodesiense*, a parasite carried by *G. morsitans*.

Bruce was knighted in 1908 and received many honours from the Crown and various academic bodies. He was president of the British Association when it met in Toronto in 1924. He was the author of more than a hundred scientific monographs which were published mostly in the *Transactions of the Royal Society*, and also edited the *Journal of the Royal Army Medical Corps* from 1904 to 1908. From 1914 to 1919 Sir David was Commandant of the Royal Army Medical School at Netley. A.G.N.

Books for Tired Eyes

Oculists, opticians, and physicians with patients who find time heavy on their hands because eyestrain prevents their enjoying good books, will welcome the knowledge that they can refer their patients to "Books for Tired Eyes" by Charlotte Matson, a list just published by the American Library Association.

"Books for Tired Eyes" lists only books in large print. These enable people to read with the least amount of fatigue and are especially valuable for people with defective eyesight. Even people with normal vision will find relaxation in the books recommended. The books listed have been chosen with due regard for the differ-

ing tastes of readers. The titles are arranged under such headings as fiction, biography, travel, literature, history, books for young people, and books of general interest. A list of books in extra large type, called the "Clear Type Series," also included, makes reading easy even for those whose eyesight is unusually poor. This seems to be a useful innovation.

"Books for Tired Eyes" may be secured at most public libraries, or may be purchased directly from the American Library Association, 520 North Michigan Avenue, Chicago. 50 pages. Paper cover, price 50c. A.G.N.

On the Reform of Football

We note in a recent issue of the *Journal of the American Medical Association* (January 2, 1932) an editorial under the above heading; the second on the game of Rugby football which has appeared in that journal during the past two months. Certainly the fatalities of the game this season have been startling, and have called for severe comment from the public press. The *Journal* quotes from an editorial in the *Yale Alumni Weekly* which admits that it is shocked by the staggering roll of the past season. Collegiate magazines, while referring to facts, hesitate to make any constructive suggestions for reform. Some academic institutions that foster the game appear more interested in the scandals of professionalism that have been unearthed than in health hazards and in the above fatalities.

Of the more noted coaches, who appear to be increasing in number with the size of the gate receipts, and who write in defence of the game, the *Journal of the American Medical Association* quotes Glen S. Warner, of Stanford University, who, when interviewed, stated: "It just happens that there have been more accidents than usual. There is no denying the fact that football is a rough game, and it will always be a rough game so long as its two important fundamentals are tackling and blocking, in

which players must meet each other in personal collisions." Coach Howard Jones, of the University of Southern California, remarks: "Accidents will happen in any game but their possibilities are reduced when the condition of the players is carefully watched. Coaches are in frequent need of a doctor on the field when the team is practising to see that the boys are kept at the peak of physical condition;" on which the writer of the editorial in the *American Journal* comments as follows: "How amusing if not actually pathetic, is the picture thus raised of physicians pacing up and down the field awaiting casualties as an army surgeon awaits the wounded in actual warfare. The familiar sight of young men limping in pain, or, perchance, carried off the field, unable to walk, amid the plaudits of a spectacle-loving public, has become a disgrace to institutions which are labeled 'intellectual'."

The athletic directors and coaches are the big business men of modern football. To them the players are supposed to look for protection against "rabbit punches", "clipping", illegal blocking, flying tackles, mass plays and similar hazards. The modern football crowd may shriek for the injured player "to stick it out," and the injured player may wish to do so, but the captain and officials should see to it that an injured player receives proper attention. In an editorial in this *Journal*,¹ in 1923, the writer asked the question whether in a university ability to excel in games should become an end in itself. "Does this magnification of sport, with the specialized training demanded by it, so enter into the life of the student footballer as to encroach on the time necessary for his intellectual studies? While there may be no fear that football or any other sport will become a primary object in any Canadian university, one may observe with a jealous eye the part that sport is demanding in the life of a Canadian student who is fortunate enough to possess a finely developed athletic body." A.D.B.

1. *Canad. M. Ass. J.*, 1923, 13: 835.

THE GOOD LEECH.—Than considre thou shortly her of that a phisicien visiteth ofte the houses and contrayes of seke men. And secheth and serchith the causes and circumstances of the sikenesses: and arayeth and bringeth with hym divers and contrarye medicines: And he refuseth not to grope and handle, and to wipe, and clense preuy membres and woundes of syke men. And he bihotith to all men hope and truste of recouering of heale: And he saith that he wil softly brenne that whiche shall be brente, and kytte that which shal be kytte: And leste the hole parte shulde corrupte, he

spareth not to brenne, and to kitte of the parte that is rotted; and if a parte in the righte syde aketh he spareth not to smite in the left syde. A good leche leueth not kitting or brennyng for wepyng of the pacient? And he hideth and couereth the bitterness of the medicine with some maner of swetenesse. He drinkith and taasteth of the medicine, though it be bitter; that it be not ayenst the seke mannes hart: and refreineth the seke man of meate and of drink: And letteth him haue his owne wyll, of the whole helth is nother hope nor trust of recoueringe.—Bartholomaeus Anglicus, Bk. VII, chap. 70, Berthelet's version, 1535.

Clinical and Laboratory Notes

AN IMPROVED CATHETER FOR ENDO- TRACHEAL NITROUS OXIDE OXYGEN ANÆSTHESIA*

BY RALPH HARGRAVE, M.B.,

Toronto

In a paper read before the Seventh Annual Congress of Anæsthetists at Minneapolis in June, 1928, and the Eastern Society of Anæsthetists and the Canadian Society of Anæsthetists at Boston in October, 1928, I described the use of a specially designed catheter for administering an endotracheal nitrous oxide oxygen anæsthesia. This catheter was described as a silver wire woven gum elastic catheter with oblique end in sizes Nos. 32, 34, 36, 38, French gauge. My experiences with this catheter during the last three years have proved to me that it is difficult to introduce the large oblique end between the vocal cords unless the trachea is widely dilated and the cords thoroughly relaxed with the anæsthetic, or an inspiratory effort. Any of my failures to introduce the catheter were due to this condition.

To overcome this difficulty I designed what is called an olive-tipped or probe-ended silver wire woven gum elastic catheter. The length of the bevel has been increased and the edges of the opening rounded with gum elastic composition. At the proximal end of the bevel I have put a gum elastic olive-tipped end on a metal bar. The end which connects with the gas-oxygen apparatus is flared out to one size on all catheters, so that it may be cut to fit any size adapter. This is demonstrated by the accompanying illustration. With this improved catheter it is not necessary to have the larynx and vocal cords thoroughly relaxed, for as soon as the epiglottis is raised with the tip of the laryngoscope and the opening of the larynx and vocal cords is exposed, the olive-tip may be easily introduced and gently pressed onward between the cords. If there is a spasm of the larynx at this moment it is safer to wait until the patient makes an inspiratory or expiratory effort, when the tube may be safely pushed further down the trachea between the cords for about two inches.

I believe the use of this type of anæsthesia is

* Read before the Section of Anæsthesia, Academy of Medicine, Toronto, October 26, 1931.

becoming more popular for these several reasons. First, there is little or no post-operative vomiting; secondly, recovery of the patient is very rapid; thirdly, it is not necessary to saturate the patient with a large amount of anæsthetic; fourthly, it offers the only practical and positive method for administering nitrous oxide and oxygen to a patient over any great length of time for nose and throat operations and continuing an even level of anæsthesia. Again, I feel this method of endotracheal anæsthesia is a more natural method, in that no very great pressure is developed within the lungs and the respiratory efforts of the patient practically control it. This cannot be said of the endotracheal method of anæsthesia, using an electric pump and forcing the air laden ether into the trachea under pressure through a small catheter. I feel that this latter method will be discarded in time.

This method of endotracheal anæsthesia used with nitrous oxide oxygen with the large tube or catheter is being recommended favourably by our diabetic specialists for nose and throat operations. It has been found that the blood-sugar balance is not disturbed at all, which cannot be said of other types of anæsthesia. Very frequently, food may be given to the patient within an hour or so following the operation. This cannot be done after other types of anæsthesia and is a distinct advantage in diabetic cases. It is also being used successfully in those conditions of the chest, such as asthma, chronic bronchitis, and tuberculosis, where one is anxious to eliminate ether as much as possible.

May I offer a little advice to those who have not had much experience with this type of anæsthesia? I have found it necessary in all my cases to add ether during the induction period until it is possible to open the jaws easily with the mouth gag. I now use the face mask instead of the nasal mask, as the latter has been found to offer no advantage in the induction. As soon as the catheter is introduced the ether is immediately discontinued. The amount of ether necessary to accomplish this end is so small that it has no effect upon the result of your nitrous oxide-oxygen anæsthetic, and yet, if one attempted to do some cases without using ether for induction purposes, I am afraid he would find himself in considerable difficulty, and very probably damage teeth or cause extensive contusion to the pharynx and larynx of the patient with the laryngoscope. Of course, when certain pre-operative drugs are used it is often not necessary to add any ether.

The pre-operative medication that I have



been using as a routine in these cases has been, for men, an H.M.C. No. 1, an hour and a quarter before operation, and two capsules of nembutal (three grains) forty-five minutes before; in women, I use an H.M.C. No. 2, an hour and a quarter before, and two capsules of nembutal forty-five minutes before. Under this pre-medication, the patients come to the operating room in a very drowsy condition, and with some a short induction with nitrous oxide and oxygen is sufficient to allow the introduction of the catheter.

These catheters have been made according to my specifications by Down Bros., of London, England, and are described by them as Hargrave's olive-tipped or probe-ended silver wire woven gum-elastic endotracheal catheters, sizes 32, 34, 36, and 38, French gauge.

THE ZONDEK-ASCHEIM TEST

The hormone pregnancy test, as originally introduced, has two drawbacks—namely, the high immediate mortality among the mice and the long time required for the reaction to appear (about 100 hours). The first difficulty can be got over by shaking the urine with ether in such a way that toxic substances soluble in ether are removed, while the pituitary hormone is unaffected. The ether also removes some substance which restrains the reaction, and it is the experience of the Budapest Obstetrical and Gynaecological Clinic that blood-dots and yellow spots appear in greater number. When they added glucose this so much enhanced the biological reaction that the changes took place within 72 hours. At the Budapest Gynaecological Clinic the test is performed as follows: 30 c.c. of freshly filtrated morning urine are shaken out in a separating funnel with 90-120 c.c. of ether; the urine is then left to stand for an hour, and to it 0.9 g. of glucose is added. During the next two days the five young mice are given six subcutaneous injections of 0.5 c.c., and 72 hours after the first injections they are killed and examined. The ovarian changes characteristic of the gravidity test—i.e., the blood-dots and corpora lutea—are so obvious that histological examination is superfluous. The reaction may be seen with the naked eye in a glycerin preparation or viewed with a microscope. — *The Lancet*, 1931, 2: 1151.

THE PRESERVATION OF BLOOD-GROUPING SERUMS

L. Rosenthal points out that the contamination of hæmagglutinating serums by bacteria may be a source of error in blood-grouping tests, and that, where these tests are performed fre-

quently, the maintenance of sterility in the serums is difficult. The addition of various disinfectants such as chloroform, phenol, and glycerin has proved unsatisfactory, owing to the formation of precipitates. Dyes, such as brilliant green and gentian-violet, protect the serums from bacterial contamination, and, moreover, by selecting dyes of different colours, mistakes due to erroneous labelling may be avoided. Rosenthal adds to each cubic centimetre of Group II serum 0.01 c.c. of a 1 per cent aqueous solution of neutral acriflavine, and 0.01 c.c. of a 0.5 per cent aqueous solution of basic fuchsin; to each cubic centimetre of Group III serum 0.02 c.c. of a 1 per cent aqueous solution of brilliant green. Thus the Group II serums are coloured red and the Group III green.—*J. Lab. & Clin. Med.*, August, 1931, p. 1123.

DETECTION OF OCCULT HÆMOGLOBIN IN THE FÆCES

I. Boas (*Deut. med. Woch.*, July 24, 1931, p. 1271) describes a method for detecting hæmoglobin (as distinct from hæmatin) in fæces. After three to four days of a diet containing no fish, meat, or chlorophyll, 3 to 5 grams of fæces are extracted repeatedly with pure acetone until the last fraction remains practically colourless after half an hour's contact. The acetone is removed as completely as possible; the residue is dried, preferably at 37 to 40°C., and ground to a fine powder. This is now extracted with 10 to 20 c.c. of 25 per cent alcohol, which dissolves the hæmoglobin, but not the hæmatin; this process is repeated until the filtrate is clear. To 2 to 3 c.c. of the filtrate 10 drops of glacial acetic acid and 5 c.c. of neutral ether are added; after shaking, the guaiac or benzidine test is performed on the ether extract. The hæmatin can be estimated similarly by examining the residue from the alcohol extraction. In cases of insufficient gastric acidity, or increased intestinal peristalsis, hæmoglobin is imperfectly reduced to hæmatin. The oral administration of hæmoglobin, and the subsequent examination of the fæces may therefore prove to be a useful test of these conditions. In large hæmorrhages from the upper or lower parts of the alimentary tract, free hæmoglobin appears in the fæces, but only temporarily, for within a week or two hæmatin only is found. On the other hand, the repeated minute hæmorrhages from ulcerating malignant disease are characterized by the persistence of hæmoglobin in the fæces. Thus the presence of hæmoglobin on repeated examinations is highly suggestive of carcinoma of the stomach or colon, whereas if hæmatin only is present, the cause is more probably simple ulceration.—*Abs. in Brit. M. J.*, 1931, 2: Epit. 88.

Special Articles

THE STORY OF THE CEREBELLUM*

BY NOEL R. RAWSON, M.B., B.S.

Toronto

We accept placidly the results of the labours of our predecessors: but it is stimulating and inspiring to follow the steps by which order has been evolved from confusion and to see pioneers wrestling with difficulties.

Sir Wm. Broadbent.

One of the earliest discoveries of our ancient forefathers of the forest or the cave must have been the deadly nature of a blow delivered on the nape of the neck; yet in this they did but follow the instinct shown by the tiger and the hawk in striking down their prey. As Homer sang, here lies 'the fountain of the nerves.'¹ This Herophilus found to be in the ventricle of the cerebellum or parencephalon,² an organ recently described by Aristotle.

Herophilus, who was the first professor of anatomy at the school of Alexandria, taught that "the purer blood from the heart ascends through the veins to the torcular, the wine-press; there it yields up the vital spirit and this, mixing with the air inspired through the ethmoid cells, is in the ventricle of the parencephalon converted into animal spirit, the breath of the rational soul. This diffuses through the ventricles and into the substance of the brain, and by the channels of the nerves it is carried to all parts of the body, as well to impart movement to the muscles as to carry to the seat of the rational soul the sensations received by the sense organs."

Five hundred years later, Galen³ seems to have been responsible for a few additional points. The passage of air and spirit to and from the cerebellar ventricle is guarded by the vermis, a sort of spiral valve under the control of the pineal body; the cerebellum is of a hard, firm consistency to impart strength to the motor nerves, while the cerebrum is softer for the reception of impressions conveyed to it by the sensory nerves. Until recent years the motor part of the facial nerve was still known as the pars dura, the sensory auditory as the pars mollis of the seventh nerve.

Galen knew nothing of the dissociation of the mental faculties, nor of the separate seat in the various ventricles of perception, imagination, judgment, and memory; this theory was first advanced more than a century later by a noted alienist, Poseidon. Through him, the cerebellum, more particularly the cerebellar ventricle, became the organ of memory, a sort of chest for the safe storage of ideas and images. It was protected by the vermis against a too sudden access of spirit from the anterior ventricles, a function later assumed for the anterior medullary velum,

the valve of Vieussens. The concept was warmly received by the Arabians and by them handed down to the mediæval scholasts. Cupping over the hollow of the occiput was forbidden, lest loss of memory be induced, not only in the patient but also in his progeny.⁴ Benivieni, the pioneer of autopsies in the 15th century, relates the story of a confirmed thief, who at each fresh trial evinced a remarkable, if somewhat convenient, lack of memory for his past misdeeds. Post mortem, his cerebellum was found to be represented by a mere tag. It was an Irishman who opened the skull to remove the organ of forgetfulness.⁵ Though Vesalius reverted to the older, simpler Galenic position, others, as Ambroise Paré and Nicholas Tulp, preferred the more complex differentiation. We find evidence of its appeal to the popular imagination in Burton's 'Anatomy of Melancholy,' while in 'Love's Labour's Lost,' the would-be learned school-master speaks of 'forms, figures, shapes, objects, ideas, apprehensions, motions, revolutions, begot in the ventricle of memory, nourished in the womb of pia mater.' We still store ideas in the back of the head and go to the brain-box for inspiration.

Galen's association of the cerebellum with the motor function lay dormant until revived by Varolio in his short unpretentious 'Anatomia' of 1573. Born in the year of the 'De Fabrica,' Varolio became physician to Gregory XIII, the pope who changed the calendar and sent Philip of Spain against England. He made a special study of the base of the brain and was the first to describe the 'pons transversus cerebelli.' To him belongs also the credit of being the first after Galen to emphasize the importance of the brain substance as distinct from the ventricles: he considered that the vital spirits pass into the brain from the veins coursing in its sulci, that they are there converted, as by a gland, into animal spirits, and that the effete products are drained through the ventricles into the infundibulum and thus to the pharynx.

In the cord, Varolio distinguished four columns, two anterior descending from the cerebrum, two posterior from the cerebellum. He found the nerves coming from the posterior column thicker and greyer than those from the anterior; thus they are the better adapted to the motor function and to conveying the common or dull sensations of the body that do not reach consciousness; by the animal spirits flowing through them the cerebellum therefore controls movement, particularly of progression, and becomes the centre of unconscious sensibility, one might almost say the head-ganglion of the proprioceptive system. The more delicate anterior routes serve the finer sense of touch.

It is idle to speculate how neurophysiology

*Read, September 9th, 1931, before the annual meeting of the Manitoba Medical Association at Brandon.

might have been spared centuries of detour through hypothesis and dogma had Varolio followed Galen in his experiments as he did in his dissection. It was the same idea of four spinal columns descending from the cerebrum and cerebellum that led Charles Bell to experiment on the nerve roots and, thus to his demonstration of their separate functions, the very foundation of modern neurology.⁵ But the time was not yet ripe. Rather did Varolio indulge in speculation based on anatomical relationships. Finding that the nerves from the ear and the tongue pass to the pons and thus, apparently, to the cerebellum, he considered this to serve also as the centre for hearing and for taste. Its solidity made it an excellent sounding board, while it contained just the right quantity of moisture to render particles appreciable to the taste without over-diluting them.

Varolio's glandular theory was gradually accepted, but his other arguments do not seem to have carried much weight. The cerebellum remained the organ of memory until, on the accession of Charles II, Thomas Willis was installed as Sedleian Professor of Natural Philosophy in the University of Oxford. Willis was a scholar of the old school, ready to build a whole doctrine of the nervous system on pure supposition and argument, "to form," as he himself acknowledged, "a certain poetical philosophy and physick neatly wrought with Novity and Conjectures." This was by no means the measure of the seventeenth century, so Willis was driven to an examination of the brain to seek the relationship of its several parts. The actual dissection he entrusted to his friend and pupil, Richard Lower, who made of it a work of classic importance. The *Cerebri Anatome*, illustrated by Sir Christopher Wren, was published in 1664 and gained for its author world-wide recognition and the title from John Freind of "the first inventor of the nervous system." Willis found his original ideas abundantly confirmed, and evolved many excellent reasons and illustrations. Memory he placed in the convolutions of the cerebrum in closer association with phantasy and imagination. In the regular arrangement of its leaves or lappets, he saw the cerebellum to be an ideal organ, withdrawn from the busy commerce of fresh ideas and cogitations, for the orderly, unconscious control of the vital functions, the heart beat, respiration, and digestion.

The pons, with its prolongation, the pyramid, is but the pathway of the spirits generated in the cerebellum. From the pons arise the 5th, 6th, and 7th cranial nerves; from the neighbourhood of the pyramid, the vagus; the intercostal—our sympathetic nervous system—is derived from branches of the 5th and 6th. The wide area of the distribution of these nerves and their common ultimate origin in the cerebellum account for many interesting reflex actions that occur independently of the will. Thus, visceral content or discomfort is unwittingly betokened by the facial expression. The contact of the lips in a

lover's kiss, the very sight of the beloved, awaken sensations of love and lust, quicken the heart-beat, stir the breast. The sounds of music are conveyed to the cerebellum and there stored in its orderly lappets to be reproduced as required through the nerves to the larynx. The softer and more impressionable the cerebellum the greater the musical talent. Even Willis could not altogether escape the association of the cerebellum with the faculty of memory.

The very boldness of the theory gripped the imagination, but its chief importance to the progress of science lies in its challenge to experiment, then in its infancy. If the cerebellum does govern the heart, then its removal must be followed by instant death. The clarion note was sounded by the famous Dane, Nicholas Stenson, who quickly followed the publication of the *Cerebri Anatome* with a well-directed criticism. Thus the cerebellum became the main object of attack in the investigation of the nervous system. The usual procedure was to make a trephine hole in the back of the skull and either to scoop out the cerebellum with a spoon or to mush it with some sharp instrument. The experimental animal was generally the dog. Naturally the medulla oblongata was frequently involved, and there was heavy hæmorrhage from the blood sinuses. Little wonder that at first Willis's teaching was nearly always substantiated.

The most prominent supporter of the theory was the great Boerhaave, the teacher of half Europe. He regarded the lethal outcome of blows on the head and the securely fortified position of the cerebellum in the deeply seated posterior fossa under the strong, in many animals bony, tentorium as powerful testimony to the special, vital import of the organ. Moreover, in his experiments, he found that "on injury to the cerebellum, the action of the heart ceases immediately, together with all the senses, voluntary motion, respiration and life itself."⁹ Certain investigators did, however, report that animals had, for a short space of time, survived injury to and even the removal of the cerebellum. This was attributed to spirits that had remained in the trunks of the nerves going to the heart and lungs and to a certain supply through connections from the spinal cord. Still such reports and the records of acephalic monsters and decapitated animals gradually undermined the theory until Haller delivered the final blow with his demonstration of the independent beating of the excised heart, albeit this was a phenomenon already described by Harvey. In the numerous experiments that constituted his enquiry into the sensibility of the brain, Haller failed to obtain any response to injury or to irritation of the cortex, cerebral or cerebellar. On the other hand, when a stiletto was pushed into the white matter, strong convulsions were excited, originating, it may be surmised, in the corpora striata or in the brain stem. Damage to the cerebrum or to the cerebellum seemed to have equal chances of a fatal issue; so he concluded that neither part is

more vitally important than the other, that the brain is a homogeneous organ of which one part can function for another if damaged; that, further, the cortex is merely a protective covering for the functioning part of the brain, the *sensus commune*, the white matter.¹⁰

But since Willis it has ever been an axiom that variation in structure denotes difference in function, so there was a quick swing of the pendulum. Gall, of Vienna, was soon teaching the elements of phrenology, that the brain is a composite of various organs, of which the cerebellum is the seat of the sexual instinct. While yet a boy, Gall had observed that his companions of the bull-neck type tended more than others to be sexually inclined; the distance between the occipital protuberances became for him the index of amativeness; later he found that this was correlated with the size of the cerebellum. Clinical histories with post-mortem findings and studies in comparative anatomy, made by himself and by others, lent ready support to the suggestion. Thus Baron Larrey, Napoleon's surgeon-general, reported instances of sterility following wounds in the back of the head. Asylum records showed disease of the cerebellum to be common in sexual perverts. At a somewhat later date, Serres demonstrated the association of tumours of the cerebellum, more particularly of the vermis, with uncontrollable priapism, due, as we now suspect, to irritation of the medullary centres.¹¹ As a matter of at least passing interest, it may be mentioned that Gordon Holmes has reported a family of three brothers, all of whom showed congenital underdevelopment both of the cerebellum and the testicles.¹² Boerhaave and Haller ruled the eighteenth century with true Johnsonian gravity, while in France and Italy, the foundations of accurate, unbiassed investigation were being truly laid.

Within ten years of the publication of Willis' theory, Du Verney had removed both cerebrum and cerebellum from the skull of a pigeon, filling the space with flax-seed. The bird continued to live for some time and even to search for food.¹³ Chirac, of Montpellier, succeeded, by blowing air into their lungs, in keeping dogs alive for some hours after the removal of the cerebellum, an experiment already reported in ancient time by Oribasius.¹³ In 1760, Lorry succeeded in showing that the part of the brain, injury to which is followed by instant death, is not the cerebellum, but an area near the beginning of the spinal cord, at a level between the second and the third cervical vertebrae.¹⁴ Pourfour du Petit had already noted the occurrence of nystagmus on cerebellar lesions, and had corrected his earlier impression of its sensory function. Lorry demonstrated the first indication of inco-ordination. He pushed a long needle through the one hemisphere of a pigeon's cerebellum, avoiding with great care the brain-stem; the bird seemed to stagger in its walk, as though one half of the body were weaker than the other. Saucerotte was the first to call attention to the forced rolling

movements and to the forced positions, the opisthotonus, pleurothotonus and skew strabismus, consequent upon cerebellar lesions. Mehée de la Touche investigated the cause for the cerebellar position of the head.¹⁵ He injured first one side of the cerebellum, then the other. As the head remained in the position assumed after the first injury he argued that the position was not due to muscular contraction, but rather to paralysis, or, as we would say to-day, hypotonia.¹⁶

With interest roused in the phenomena of electricity, a resemblance was early found between the alternate layers of grey and white matter, seen on section of the cerebellum, and the metals in a voltaic pile; the organ was thought to be the analogue of the electric organ of the torpedo. Rolando, the celebrated anatomist of Turin, found that, on bringing one lead of a voltaic pile into contact with the cerebellum and the other with a limb, stronger contractions were obtained than when the first lead was placed on the cerebrum. He also noted that, in contradistinction to those with damage to the cerebrum, animals with cerebellar lesions made attempts to avoid obstacles, to pick up morsels of food, but frequently failed; the will was there, but not the power to carry its purpose into effect. Total removal of the cerebellum caused paralysis. He therefore concluded that its chief function is the reinforcement of the motor impulse, particularly in voluntary movement.

A new era opened in 1823 with the presentation to the Academy at Paris of the researches made by Flourens on the functions of the various parts of the brain. His account of the pigeon, deprived of the cerebellum formed, as Miller justly remarks, the basis of all future studies. His success was partly due to the advances in the anatomy of the brain, thanks largely to Gall, partly to improvement in technique. He operated chiefly on young pigeons and removed sufficient of the skull to obtain a fair view and thus avoid much of the hæmorrhage from the blood sinuses. We cannot do better than quote his own words:¹⁷

I removed the cerebellum from a pigeon, slice by slice. During the removal of the first layers the bird only showed a little weakness and lack of harmony in its movements.

On removal of half the organ it showed an almost universal agitation—but no sign of convulsion. Its movements were brisk, but ill-regulated: it heard and saw. On total ablation of the cerebellum, the animal completely lost the ability, which the previous mutilations had altered more and more, of flying, jumping, walking and standing. Placed on the back, it could not recover its position, try as it might; far from remaining quiet as a pigeon deprived of its cerebral lobes, it kept up a wild and almost continuous movement, though not of a set or determined character. For example, it saw the threatening hand, attempted to avoid it, made a thousand twists and turns to do so, but could not. That is to say, the will, the senses, the perception remained, the power of movement was retained, but the co-ordination of movement, the ability for controlled and determined movement was lost.

Flourens was so struck by the close resemblance of the animal's reeling gait to that of a drunkard

as to be persuaded that alcohol has a selective action on the cerebellum.

In consonance with the development of the reflex theory, Lussana, in 1862, suggested that the co-ordination of movement depends upon impressions from the muscles, the muscle-sense described by Bell, of which he presumed the cerebellum to be the centre. The weight of evidence, as adduced by Pourfour du Petit, Flourens, Luciani, and more recently by Holmes, goes to prove the cerebellum devoid of all sensory function, even muscular; yet to a certain extent the idea foreshadows Sherrington's concept of the organ as the head-ganglion of the proprioceptive system.

As a result of numerous experiments in which in various ways he injured the cerebellum of pigeons, Weir Mitchell,¹⁸ in 1869, held that those that survive the immediate effects of the operation gradually regain the co-ordination of movement, but lack the power of sustained effort. He considered the apparent incoordination of movement to be rather a confusion of motion due to irritation of the various nerve paths passing from the cerebellum to the voluntary musculature. In terms similar to those of Rolando, he defined the cerebellum as a "great reinforcing organ, capable of being more or less used in volitional muscular motion."

Also in line with Rolando is Luigi Luciani, whose work forms the basis for the modern analysis of cerebellar activity. His first announcement was published in 1891 after seven years of diligent study. Profiting by the recent introduction of aseptic technique into surgery, he was able to operate with accuracy and assurance and to use the higher animals, dogs and monkeys.¹⁶ Many of these he was able by careful supervision to keep alive and in good health for several years.¹⁹

Magendie, Ferrier, and others had paid much attention to the forced movements elicited by damage to the cerebellum, and had therefrom deduced a theory of equilibration in accord with the vestibular connections. Luciani showed them, however, to be but an initiatory stage, and considered them "dynamic symptoms," due to irritation of the centres in the brain-stem and cord. They have been more recently explained as "release symptoms," due to the removal of various cerebellar regions, which have an inhibitory influence on muscle tone.²⁰

Luciani found the essential defects following the removal of the cerebellum to be muscular weakness, lack of muscle tone, and tremors: asthenia, atonia and astasia, three manifestations, as he suggested, of the loss of a single process—the action of reinforcement. After a time the lost powers were in great measure regained. This was due, as he proved by their subsequent ablation, to compensatory activity of the remaining part of the cerebellum, if any, or of the sensori-motor cortex in the contralateral Rolandic area. Of Flourens' concept of co-ordination, Luciani spoke very scathingly, stigmatising it

as "an abstract and fictitious entity, obscure, imperfect and unintelligible."²¹ Yet it is the first groping toward the present idea of synergia, the co-operation of the various muscles in movement or posture.

In the "nineties" began the epoch-making enquiries of Sir Charles Sherrington into the integration of the nervous system. A movement is but a series of postures; the smoothness and effectiveness of movement depend upon the regulation in postural tone of the various muscles and groups of muscles that act as agonists, antagonists and fixators; this tone, in turn, is regulated reflexly by the afferent impulses from proprioceptors in the contracting muscles themselves, in joints, in tendons and in the vestibules; the head-ganglion of this proprioceptive system is the cerebellum.²²

On the clinical side, the most important contribution has been that of Gordon Holmes, based on cerebellar tumours and on gun-shot wounds received during the late war.²³ Luciani's observations were confirmed in nearly all particulars. Practically all the symptoms of cerebellar defect could be correlated with the loss of postural tone; fatigability, as described by Weir Mitchell, was a marked feature and was attributable to the reliance on voluntary contractions, which involve fatigue, without the assistance of postural tone, which is indefatigable. Many cases showed in addition marked weakness on voluntary exertion, as though lacking some reinforcing moment.

In 1924, Magnus, of Utrecht, and his colleagues made the startling announcement that the thalamus animal can maintain its correct posture in standing, running and jumping, with every evidence of refined adjustment whether the cerebellum is intact or not. On the other hand, Rademaker has shown that animals deprived of the cerebellum, with the cerebrum and remainder of the nervous system left intact, exhibit a gross and persistent ataxy of movement, a characteristic release phenomenon. Thus, as stated by Walshe, "It is only when the cerebral motor cortex activates the reflex mechanisms of brain-stem and cord that the cerebellar intervention in the motor taxis of the organism occurs, *i.e.*, it is solely voluntary." It is one of the triumphs of modern neurology to have shown that "the secret of cerebellar function is to be sought in a close functional relationship between cerebral motor cortex and the cerebellum."²⁴

The association of the nerves from the cerebrum and from the cerebellum had been vaguely indicated by Sir Charles Bell:²⁵ it was more definitely formulated by the philosopher, the disciple of Herbert Spencer, Hughlings Jackson, who, as Sir William Broadbent has said, "penetrated more deeply than even experimental science into the relations of the different nerve centres with each other and with the periphery, bringing to bear upon nervous physiology and pathology the speculations of evolutionary philosophy." (*Brain*, 1906) "All the muscles of the

body," said Jackson, "are innervated both by the cerebrum and by the cerebellum. The cerebellum is the centre for continuous movements, for tonic contractions; the cerebrum for changing movements, for clonic or phasic contractions. Every combined muscular adjustment necessitates the co-operation of both these organs; no steady movements can be produced by the alternate contractions of some groups of muscles, except in so far as other groups of muscles are maintained in a state of continuous contraction. Hence it may be inferred that all movements of the body are coordinated both in the cerebellum and in the cerebrum."²⁶

This intimate association has been confirmed clinically and by experiment. Sir David Ferrier observed that in cases of long-standing disease of one cerebral hemisphere the opposite lobe of the cerebellum frequently degenerates.¹² Luciani noted the compensatory action of the cerebral motor cortex for the loss of the contralateral cerebellar lobe. In 1893, Risien Russell found that ablation of one lobe of the cerebellum lowers the excitability of the opposite Rolandic area, while, later, (1912), Rossi showed, conversely, that the cerebellar faradic stimulation enhances it.

The correlation of anatomy with the findings of experiment and the clinic is nowhere so important as in the unravelling of the nervous system. We have seen the endeavours of Varolio, of Willis and of Gall to deduce its functions from a study of its anatomy alone. Since, however, it has been proved that the enquiry after function is the domain of experiment, by nature or by design, the duty of anatomy has been to demonstrate the basis for the facts revealed and, sometimes, to give impetus to further research.

The introduction of the achromatic lens afforded opportunity for the development of the cell theory. One of the foremost in this move was Johannes Evangelista Purkinje, of Breslau, by whom the characteristic cells of the cerebellar cortex were first described in 1837. By the study of consecutive hardened sections of the brain and spinal cord, yeoman work was done by Benedikt Stilling who was one of the first to use the microtome. In 1874 he described the intrinsic nuclei of the cerebellum, of which he issued a fine album in 1878. Marchi, acting on the Wallerian theory of neuron degeneration, traced the paths destroyed after Luciani's operations on the cerebellum. Sir Victor Horsley and Clarke demonstrated with the aid of the stereotaxic needle the efferent paths leading from the central nuclei and showed that the cortex is purely afferent. By the diligent studies of these and many other pioneers, the complicated structure and connections of the cerebellum have been worked out.

Nerve paths reach the cerebellum from the cord through the inferior peduncle, and, by the tract of Gowers, through the superior; from the vestibule by the inferior; and from the cerebrum by the middle. Efferent paths pass through the superior peduncle to the red nucleus and thence

to the cerebrum and all parts of the central nervous system. The Purkinje cells are in constant communication with the labyrinth, muscle, joint and other proprioceptors. From the cerebrum they learn through the middle peduncle the desire of the will; by the manifold connecting system of the molecular layer the messages are sorted and correlated; instructions are thence sent to the intrinsic nuclei; the efferent impulses pass by way of the superior peduncle to the red nucleus; "they set or tune the segmental motor mechanisms so that they respond immediately, effectively and with appropriate force to cerebral messages" (Holmes, 1917). Thus is produced the necessary synergic contraction of all the muscles in a smooth co-ordinated movement.

An intimate association of definite areas of the cerebellar cortex with corresponding parts of the body has been suggested by various authors, pre-eminently by Bolk, on grounds of comparative anatomy, and by Weisenburg after cinematographic study of his cerebellar patients.²⁷ It is, however, generally held that while each hemisphere is in relation with the homolateral limbs and the vermis with the trunk a further localization is not proved.

In a fascinating paper, Tilney²⁸ has suggested that the function of the archeparencephalon (the inferior vermis and vestibular nucleus) is the maintenance of posture; that of the paleoparencephalon (the superior vermis), the control of automatic associated movements; that of the neoparencephalon (the lateral lobes), of voluntary movements of the individual limb; with the neoparencephalon appears the middle cerebellar peduncle; their development is an index of the connection between the cerebral cortex and the cerebellum, an association that develops *pari passu* with the use of the smaller muscles, notably of the hand, and, consequently, as Anaxagoras would have, with the intelligence.

As recently expressed by Sherrington and Leyton, "the motor cortex selects and combines into an infinite number of combinations and sequences the component elements of the simple movements represented in spinal cord and brainstem." Walshe suggests that in this analysis and synthesis the cerebellum plays an executive rôle, that it is the "organ by which the cerebral cortex achieves integrative synergia in voluntary movement."²⁹

Ex tenebris lux. Gradually the view becomes clearer and more distinct. The path of progress is by no means straight or narrow; there are wanderings far and wide; yet those very hypotheses that seem to have led farthest astray have provided lessons and revealed truths indispensable to the general advance. Neither does progress consist in the bare collecting or marshalling of facts, but in their fortunate, or, if you will, inspired, arrangement in their proper sequence. The lead is taken by skilled imagination under the guidance of revealed fact.

In conclusion, I would express a deep debt of gratitude to Professor Neuburger's 'Die historische Entwicklung der Gehirn- und Rückenmarkphysiologie vor Flourens'. This classic roused my first interest in the study and has been my guide over the major portion. I would also like to thank Miss Monk of the Medical Library, University of Manitoba, Dr. C. F. Wylde of the McGill Medical Library, and Mr. H. E. Powell of the Royal Society of Medicine for their ready help at all times.

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Men and Books

THE MEDICAL HISTORY OF
BRITISH COLUMBIA*

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Vancouver

MEDICAL MEN OF THE CARIBOO

It is estimated that from thirty to thirty-five thousand men were attracted to the Fraser River and Cariboo gold fields during the period 1858 to 1865. Among these, no doubt, were numbered a score or more of medical men, but when, even with the assistance of men yet living who as boys were in Barkerville in 1865, an attempt is made to single out some of these pioneer medical men, one finds that less than ten are remembered as having actually practised their profession—the rest engaging in the mining business. There was little sickness among the miners, as only the strong and hardy could stand the strain of the life. However, owing to the numerous accidents and injuries, many of them of a serious nature, and which were due to the nature of the industry, a strong appeal was made by the miners to Governor Seymour to establish a public hospital.

The fall of 1863 saw the erection of the William's Creek Hospital at Barkerville, and Dr. John Chipps, an English graduate, was appointed its first medical officer. The financial position of the institution a year later was decidedly precarious, so much so that Dr. Chipps and the steward consented to remain on duty without salary on condition that their board be

furnished. In September, 1865, Dr. Chipps sent in his resignation and Dr. Thomas Bell was appointed in his place. Dr. Chipps, who continued in practise in Barkerville, was then about fifty years of age, and was generally held in high esteem, being trusted by everyone. During his stay in the Cariboo his daughter came out from England to keep house for him, and together, when the mining business waned at Barkerville, they moved to Granite Creek and from thence to Vernon, where it is reported he died about 1886. From all accounts now available, Dr. Thomas Bell, who succeeded Dr. Chipps in the Barkerville Hospital in 1865, was the foremost medical man of the district and continued so up to the time of his death, which occurred about 1870.

Not many of the old Cariboo pioneers are left, but from Mr. J. B. Leighton, of Savona, now over 80 years of age, but still hale and hearty and with a most retentive memory, who resided in the Cariboo from 1865 and on for more than forty years, the following facts were gleaned.

"Dr. Bell was an Englishman, well qualified in his profession. He attended to his practice and did not indulge in mining as did nearly all the other doctors at that time. He was of slender build, not very robust, a skilful surgeon and well liked by all. He was the outstanding medical man of the Cariboo at that time, as he stuck to his work and was always sober. I recall a case that will illustrate his surgical skill. A miner by name of George Murdock had the end of his nose bitten off in a fight in 1866. Dr. Bell did a plastic operation, using the skin of the forearm to make a graft to cover the denuded area. I saw the man walking about with his arm tied to his head. The result was perfect.

* The previous instalments of this article can be found in the *Journal*, 1931, 25: 336, 470; 1932, 26: 88.

"At the time of the gold excitement there were four towns close to each other, only a mile or so apart, Richfield, Barkerville, Camerontown, and Maryville. On September 14, 1868, Barkerville was destroyed by fire and the miners, in referring to any event after that dated it before or after the fire."

With the decline of gold production, from 1867 onward, the population of the district by the early "seventies" had been reduced to a few hundred persons, and public support of the hospital had dwindled to the vanishing point. There was not even a medical man left in the once populous camp, and it was then that the Government decided to subsidize a physician to take charge of the medical work of the district. About 1873 Dr. Hugh Watt, with headquarters at Barkerville, was appointed to the position. Dr. Watt later moved to Fort Steele and probably died there. His son was also a doctor and was quarantine officer at Williams Head for a number of years, succeeding the late Dr. George Duncan in that position about 1896. Dr. Watt the younger met his death by accident while a patient in St. Joseph's Hospital, Victoria.

From the records of the Cariboo Hospital, August 10, 1864, the following items are noted.—

Dr. Black for services and medicines, \$780. (This probably was Dr. A. W. S. Black of New Westminster).

Dr. Brown for services and medicines, \$500.

We will now continue the narrative of Mr. Leighton as related to the writer in the fall of 1929.

"I was a boy of fifteen years of age when I arrived in Barkerville in 1865 to work in my uncle's store. The first doctor I met was a Doctor McGinnis at Yale in 1865. He was a Highland Scotsman, a scholar, and a gentleman. His practice was limited largely to the care of accident cases and treatment of venereal disease. For picking powder out of a man's face he got a fee of \$200. The following year he moved to Lytton and remained there until 1872 when he removed to the coast. He was clever and well liked, but his habits were somewhat irregular.

"In the period, 1863 to 1868, in addition to Dr. Bell, there was Dr. Trevor, a clever English physician, located at Quesnel, whose daughter kept house for him. He left the district in 1868.

"Dr. Wilkinson, a Canadian, a man of about thirty-five years of age, fine, healthy looking and wearing a full beard, which was the custom of the day, arrived in the country about 1864. He followed the mining game rather than his profession. He attended Peter Dunlevy, of Soda Creek, one of the prominent men of the district, in a severe illness and was successful in pulling his patient through. He died at Cottonwood, forty miles from Barkerville in 1866.

"Dr. T. N. Foster, a Scotsman, arrived in

Camerontown in 1863. He was a man of fine physique and a perfect gentleman. He was interested in the Forest Rose Mining Company, Camerontown. He did very little practice and seldom charged for his advice or service. He left the country after 1872, or may have died there.

"In 1864 an American homoeopathic physician, Dr. Siddall, arrived in the Cariboo. He had quite a following, but engaged principally in mining. He left the country about 1868.

"The man I am going to mention next, although not a doctor, did a large amount of practice among the miners. He was a chemist, by the name of F. W. Foster, who came to Lillooet in 1860. He did a large business in treating venereal disease, and although he told his clients he was not a doctor, they trusted him because he tried to help them. He moved to Clinton a year or two later, and was reported at one time to be the wealthiest man in the Cariboo. He left Clinton in 1900 and died in Victoria, probably in 1902. His wife only passed away this spring (1929), and he has a son and daughter living in Victoria.

"Practice in the Barkerville Hospital was comprised largely of accident cases, no contagious diseases being admitted.

"Dr. Robert Carrall came to the Cariboo in 1867. He was interested in the Minnehaha claim at Mosquito Creek. In 1871 he was a delegate to Ottawa with Dr. J. S. Helmcken and Mr. Trutch, to arrange the "Terms of Union" with the Dominion. For his service he was appointed a Senator the same year—a genial, warm hearted man and one of my best friends. I understand he died in a New Westminster Hospital."

During the decade, 1864-74, a vast extent of territory in British Columbia was prospected, a number of "strikes" were made, and the resulting stampedes caused a rush of miners to the new fields. In most instances the results were disappointing, but in some the gold recovered was not inconsiderable and justified the efforts made.

In 1864, from the Kootenays came a report of gold discovery at Wild Horse Creek. A rush followed, and, as entry into the new field was more feasible from the south, most of the miners entered through the adjacent American territory. In 1865 an all-Canadian trail was built from Princeton, via Rock Creek, Midway, Grand Forks, across the Columbia to Trail, thence, via Fort Shephard, Moyie, and Cranbrook, to Wild Horse Creek. The trail was scarcely finished before fickle fortune had decreed that the field was unprofitable and the miners were casting about for another Williams Creek. In 1865-66, the Big Bend diggings was the centre of attraction, but within a year the bubble burst, with resulting exodus of the disappointed miners.

In 1866, the project of the Western Union Telegraph Company was in full swing, its aim being to connect America with Europe via Alaska and Siberia, and the work of members of this concern led to the discovery of the Omineca and Cassiar Placers. In 1871 the Omineca excitement reached its height, some 1,200 persons being engaged in mining within a radius of twenty miles in this district. The yield for that year was \$400,000. This, however, was in the hands of a fortunate few. The majority lost everything, and for the twentieth time became, in their phrase, "dead broke". In 1875, the production of gold had fallen to 32,000 and in 1876 the mining report simply says of this district that it is "almost deserted".

Just as the best days of Omineca were passing came cheering news of gold discoveries even farther to the northwest, at the very northern fringe of British Columbia. This was the Cassiar field which, by 1874, had a population of 1,600 and produced \$1,000,000 in gold that year. This was its best year, but its decline was slow and in 1880, Cassiar produced nearly \$300,000 to the 800 miners then working.

It will be seen from the foregoing, very sketchy, outline of the search for gold that this was the motivating force which opened up the hitherto unknown regions of this vast province to agricultural development, trade and industry. In these successive stampedes, ranging over such a wide territory, extending from east Kootenay to Cassiar, it is not unlikely that some medical men were to be found. Who they were, and from whence they came, the available records afford no clue and, therefore, their story must go untold.

Mr. W. H. Keary, now city clerk of New Westminster and a resident of that city since 1860, who has been honoured by his fellow citizens in being elected eight times mayor of the City on the Fraser, very kindly assisted the writer by preparing a list of the medical men who practised in New Westminster from 1859 to date.

About the mid "seventies" two brothers, Nova Scotians, Dr. Loftus R. McInnes and Dr. Thomas R. McInnes arrived in New Westminster. The former practised in that city for a number of years and died there. He was a member of the first Medical Council in 1886. Dr. Thomas R. McInnes was born in 1840, and educated at the Normal School, Truro, N.S., and Harvard University. He was mayor of New Westminster, 1876-1878; member of the House of Commons for New Westminster, 1878-1881; Senator, 1881-1897; Lieutenant-Governor of British Columbia, 1897-1900. He died on March 14, 1904.

Another well known Westminsterite of these days was Dr. C. N. Trew, 1876-1887. He was

Vice-president of the first Medical Council in 1886, and President, 1887. He was appointed on the Board of Examiners, 1886, in the practice of medicine and medical jurisprudence. Dr. Trew passed away while in office in 1887. He was succeeded by Dr. De Wolfe Smith, who was elected a member of the Council in his stead.

In addition to the foregoing, the names of the following medical men are noted as having practised in Westminister from 1875 to 1885—Dr. Featherstone, Dr. McLeod, Dr. Sivewright, Dr. Masters, Dr. J. Garrow, Dr. MacSwain, and Dr. Cooper.

EARLY COLONIAL HOSPITALS

British Columbia has always been generous in its support of public hospitals, and probably no part of the Dominion is better served by these necessary adjuncts of modern life than is this province. In the decade ending 1930, from a population of about 600,000, the contribution of the Provincial Government amounted to over \$23,000,000, and this does not include grants given by municipalities and the receipts derived from patients' fees.

Anyone viewing the modern well equipped hospitals in Victoria, and New Westminster, the Royal Provincial Jubilee and the Royal Columbian, can scarcely envisage the early beginnings of these institutions. In Victoria, the inception of the first hospital facilities must be attributed to the Rev. E. Cridge, Chaplain of the Hudson's Bay Company, who arrived in that city in 1854, and became, later, Dean and Bishop.

The following is recorded in a little monograph entitled "Pioneer Days."

"It was in 1858 that one day a sick man was found lying on a mattress inside the gate of this Parsonage. The man admitted that he had been brought there by certain parties, who shall be nameless. 'I asked him,' said the Bishop, 'Why they had brought him to my house, and clandestinely, too?' 'Oh,' he said, 'they thought you were the proper man,' and I suppose I was under the circumstances. So the Parsonage became the first Home Hospital in the Colony. The Bishop continued: 'I appealed to His Excellency the Governor, who took the matter up and nominated a Provisional Committee as follows: Mr. Dallas, a Director of the Hudson's Bay Company; Mr. A. F. Pemberton, Magistrate and Commissioner of Police, and myself, District Minister of Victoria. We used, temporarily, a cottage kindly loaned (rent free) by Mr. Blinkhorn, on the corner of Yates and Broad Streets, afterwards occupied by the B. C. Hardware Company, and now by the J. M. Whitney Company, Jewellers. Mr. and Mrs. W. S. Seeley were put in charge, the latter as steward, while a man of Spanish extraction, named Emmanuel, faithful, industrious, was 'man-of-all-work,' a title which, in those days, was not a misnomer."

The name of the first patient was Braithwaite, and others soon followed, so that the cottage was generally full. As the necessity for more accommodation became urgent, the Committee was enlarged and set to work to secure a suitable site for a building. (The additional names are not given). Finally, after much difficulty and discussion, they "took possession of" a piece of land on the Indian Reserve and erected a wooden building on the site of what was, later, the Marine Hospital. "The Government," he it noted, "though not consulted, offered no objection." Dr. Trimble was appointed Medical Officer in charge, a pamphlet containing the Constitution and By-Laws of the new institution was printed, and the Royal Hospital became an accomplished fact.

From Bishop Cridge's Diary we learn that Divine Service was held in the hospital for the first time on December 19, 1858, and a later note informs us that on Sunday, February 13, 1859, collections for the hospital were taken up in Christ Church at both morning and afternoon services, amounting to \$149. This is the first record we have of a "Hospital Sunday."

In the following year, 1863, provision was made for accommodation of female patients and an infirmary for women was established in that year. The laying of the foundation stone took place in 1864. The description of the laying of the foundation stone of this building, which was afterwards taken over by the Hospital authorities and became the Royal Hospital, should find a place in these records as it only ceased to exist when the present Royal Jubilee Hospital was built.

The following is from the *Victoria Daily Chronicle* of November 24, 1864:

"The ceremony of laying the corner stone of the Female Infirmary, at the head of Pandora Street, took place yesterday, and attracted a large concourse of people to the spot, a great proportion of whom were ladies. The building, which is to be a commodious one-storey frame, is situated on a commanding site of the head of Pandora Street, overlooking the city and harbour, Royal Bay and the Straits, from Dungeness to Point Ringgold—the view taking in for a long distance the American and Metchoshin shores, Race Rocks, etc.; the whole presenting a scene of unexampled beauty and loveliness to which the pencil of an artist could scarce do justice.

"Mayor Harris opened the proceedings by introducing Rev. Dr. Evans, who offered up a most impressive prayer, invoking the blessing of the Almighty upon the institution and upon those who had been instrumental in founding it, and concluding with the Lord's Prayer.

"Rev. E. Cridge then read the following document, which was subsequently placed beneath the corner stone of the building, and is the one which has been brought to light:—

This day, Wednesday, November 23, A.D. 1864, was laid, in dependence on the blessing of Almighty God, the corner stone of the Victoria Female Infirmary, by Mrs. Harris, Mayoress of Victoria.

Enclosed herewith are the first public appeal on behalf of the institution and the first annual report, conveying information as to its objects and early working; also copies of the local daily papers published in Vancouver Island.

The present members of the association are:—

Patronesses: Lady Douglas, wife of Sir James Douglas, K.C.B., late Governor of British Columbia and Vancouver Island, etc.; Mrs. Kennedy, wife of Arthur E. Kennedy, C.B., present Governor of Vancouver Island, etc.

President—Mrs. Harris, Mayoress of Victoria.

In a letter from Dean Cridge, July 22, 1869, the following excerpt is taken. "The building (Female Infirmary) is of a very superior character, was erected by public subscription, and cost, together with the site, \$4,000."

The matron of this building "of a very superior character" was to receive the princely remuneration of \$25 per month, and, to quote again from the minutes, "It was unanimously agreed that when there is no patient in the Infirmary no salary shall be paid to the Matron, but that the usual allowances for board, lights and firing to continue."

In the annual report of the Hospital, 1865, the following are listed as the medical attendants: Dr. Ash, Dr. Davie, Dr. Dickson, Dr. Haggin, Dr. Powell, Dr. Trimble.

The medical men of the city cooperated very heartily in this movement, and the following letter was received by Rev. E. Cridge, Hon. Secretary.

Victoria, May 3rd, 1865.

My dear Sir,

I am authorized on behalf of the surgeons attending the "Royal Hospital" to offer their services gratuitously to the Female Hospital.

Will you be so kind as to place their communication before the Directresses at your earliest convenience.

I am, dear Sir,

Very faithfully yours,
James Dickson, M.D.

And in addition to this, Doctors Trimble, Ash, Powell and Davie sent personal letters to the ladies offering their "professional services" to "your valuable Institution." Needless to say, these offers were gratefully accepted, each doctor "taking charge" by monthly rotation, and being requested "to conduct to their respective terminations the cases which he begins to attend."

Many references were made to the Female Infirmary in Bishop Cridge's Diary, and it was not long before circumstances pointed to the necessity for amalgamating the two hospitals. The ladies were finding the financial burden too heavy for them, and the public-spirited citizens, already over-taxed, could not respond to the demands made upon them for maintaining two separate institutions involving duplication of equipment and service, and with but one aim and object—the care of the sick and the ameli-

oration of suffering. Dean Cridge, therefore, at the end of the year 1869, urged the union of the two hospitals, and Dr. J. S. Helmcken's suggestion "That the Board take over the Female Infirmary and that the patients from the Royal Hospital be moved there and the Institution in future be known as The Royal Hospital," met with universal approval, the Directors promising to maintain a ward for women and the ladies pledging their continued interest and support. Thus step by step this union was accomplished and the foundation "well and truly laid" for the great and noble work which later found fuller expression in the fine institution now widely known as "The Provincial Royal Jubilee Hospital".

THE ROYAL COLUMBIAN HOSPITAL, NEW WESTMINSTER

In April, 1859, following the arrival of the main body of the Royal Engineers in New Westminster, staff-surgeon J. V. Seddall opened on the mainland the first hospital of its kind, at the Engineer's Barracks, constructed that spring at Sapperton on the present site of the British Columbia Penitentiary.

Dr. Seddall's original hospital took care of surveyors and workers on the Cariboo Road during the following four years. When the Engineers were disbanded in 1863, their camp was dismantled and Dr. Seddall turned over his equipment to the New Royal Columbian, which, late in 1862, had been organized by the citizens of New Westminster with the help of Col. R. C. Moody, officer in charge of the Engineers. The first building was at Agnes and Fourth Streets and accommodated 30 beds. The work of the hospital from that time reflects interesting stages in the settlement of the mainland.

Sir James Douglas, Governor of British Columbia to 1864, and Frederick Seymour, Governor to 1869, always showed interest in the work of the hospital. W. H. Keary, secretary from 1875 to 1911, records numerous distinguished patrons and contributors, including Lord Strathcona and the Duke of Sutherland. Lord Milton was a patient during his western tour in 1863.

While the gold rush was in progress, during the "sixties" and early "seventies", the majority of the patients were miners, either ill or injured at their work. They often had to be transported immense distances by stage and wagon from the Cariboo to New Westminster, and in many cases they suffered from gangrene by the time they arrived. Numerous patients were treated for bullet wounds received in brawls at the mining camps or in clashes with hostile Indians during the height of the excitement.

Expanding with the growth of the population, the original Royal Columbian Hospital

was moved from Agnes Street to its present site in Sapperton in 1889. In 1902 the women's hospital on Third Avenue was merged with it. Several frame structures were added on the ten-acre site by 1908. The modern brick building, capable of further expansion, was completed in 1914 and is now accommodating 212 beds.

WILLIAMS CREEK HOSPITAL, BARKERVILLE

In 1863 when the Cariboo gold fields attracted thousands of men, the need of a public hospital became urgent and the following record gives an account of the establishment of the hospital at Barkerville:

Cameronton, July 2, 1864.

To

His Excellency Frederick Seymour, Esq.

On the 22nd of July, 1863, the inhabitants of Williams Creek resolved at a public meeting "That a Hospital among them was imperatively demanded." On the 29th of that month they decided on building and on the first of October following, the institution was opened for the reception of patients.

From that time till now, 32 sick men have been admitted of whom 26 have been discharged cured; 3 have died, and 3 remain in the building. Up to June 1864 the sum collected for the Hospital amounted to \$2694, (the approximate) expenditure up to that time being \$7000. The Government grant of \$2500 (for which we beg to tender our grateful thanks) being added to the former \$2694, leaves a debt of \$1806. All bills have been carefully audited, many of them taxed

Present Committee:— That it is the desire of the Committee that the Hospital be made Government matter and that the funds for its support be supplied out of the General Revenue as a whole or from some specific item of the same". The expression of the Committee as contained in that resolution is but an echo of the voice of the whole mining population. The collectors are met with assertions as follows,— "We are taxed on coming into the Colony, our goods and food are taxed and retaxed in their transit to us. The prices of transfer have been increased and cannot the Government provide, out of its own revenue, a Hospital for our needy sick." The additional objections are also urged of the scarcity of labour and the consequent dearth of money. Your Excellency will allow that the exclusion of sick men from the benefits of Hospital . . . is no less a calamity than (we had almost said) a stain upon our national character but to this it must come if the institution has to depend on the voluntary subscriptions of an unwilling public. We have been informed that it was the declared intention of the late Governor Sir James Douglas to appropriate the entire "Head Money" of the Colony to Hospital purposes . . . It is our belief that \$6000 per annum would suffice to maintain the Hospital in an efficient state.

A. Browning,
Hon. Secretary.

Subsequent records indicate the progress of events. Dr. John Chipps, in a letter to the Colonial Secretary, dated November 9, 1865, offered to take charge of the hospital for two months without salary. Subsequently, Dr. Thos. Bell took over the superintendency.

Chartres Brew in a letter to the Colonial Secretary, suggested closing the hospital.

"As the sum already expended greatly exceeds the amount which His Excellency is willing to grant for the maintenance of the Hospital, and as there is little prospect of obtaining subscriptions here to any amount sufficient to defray the difference between the sum granted and the amount expended. I regret to say that I fear the Hospital will have to be closed. The medical attendant's salary was reduced some months ago from \$150 a month to \$100 and the steward's salary from \$120 to \$80, besides which he is to do the washing.

"Dr. Bell desires me to say that rather than have the Hospital closed he will give his professional attendance gratis after the 31st of December next. The method formerly pursued was to pay the steward \$40 a month for the board of each patient, at present the actual expense of providing food, etc., is paid on production of the bills, the result is that the monthly cost of feeding each patient is reduced to a little over \$30 a month.

"There are only two patients in the Hospital, one of them is able to pay for his board, and I have directed he shall do so accordingly."

In 1870 the total number of patients from 1st of January to 31st of October was 34, and the average number of days in hospital 42. Attendance and medicine was given to 350 outdoor patients. The daily cost of each patient averaged about \$1, and the balance of the government grant, after deducting wages and food of hospital attendant, but poorly remunerated the doctor in charge for his services, as no public subscription was raised for the support of the hospital until this year, when through the exertions of the Grand Jury, subscriptions to the amount of \$1,540 were given.

With the decline of mining in the Barkerville district the number of patients requiring attention dwindled to such small numbers that the government found it necessary to put in a subsidized medical officer to take care of the work, as no longer could adequate support be expected from the small mining population. To-day, the hospital needs of this section are cared for in a well appointed and well equipped institution at Quesnel on the Fraser River, some 60 miles from Barkerville.

MEDICAL LEGISLATION FROM COLONIAL TIMES TO THE PRESENT CENTURY

With the gradually increasing population of the colony, it was felt necessary to organize the profession and give it a legal standing. To this end the "Medical Ordinance" was enacted. It was termed "An Ordinance respecting practitioners in medicine and surgery" and was passed at New Westminster 1867.

Briefly, it provided—that anyone possessed of a diploma and then practising in the colony, could register on payment of a fee of \$10.00—also, that anyone possessed of a diploma or license to practise medicine or surgery from any school requiring a compulsory course of

study extending over not less than 3 years, was permitted to register on payment of the fee.

Later, it was found that the Act ran counter to an Imperial Act, whereby those registered under the latter were exempt from the provisions of the new "Ordinance" of 1867. This exemption of old country graduates did not last long and was dealt with in 1868 by amendment, thereby bringing all Imperial practitioners under the provisions of the Provincial Ordinance.

The name of the first registrar was Charles Good, who was also Clerk of the Legislative Assembly. In 1867, "An Ordinance respecting the practice of surgery and for the encouragement of the study of anatomy" was passed. In 1870—"An Ordinance respecting practice in medicine and surgery" was passed. Its preamble outlines its object.

"Whereas it is expedient to amend the Medical Ordinance of 1867 and to bring the same into uniformity with the Imperial Legislation, by providing for the registration in British Columbia of the members of the medical profession already in the United Kingdom, under the Imperial statutes, Ch. 21 and 22, Vict. Cap. 90, etc."

These Ordinances continued in force until the Medical Act of 1886 was passed. The members of the first Council were:— Drs. Powell, Trew, Davis, Milne, Tunstall, Cluness and L. McInnes, and the officers were Dr. Powell, President, Dr. Trew, Vice-president and Dr. Milne, Secretary. Of all the practitioners whose names appeared on the first list of the Register of the College of Physicians and Surgeons of British Columbia, April, 1886, only one remains to-day—Dr. Geo. L. Milne, of Victoria.

There were no candidates for examination at the first meeting of Council at Victoria, August 3, 1886, and it was not until November 2nd of the same year that Dr. W. A. De Wolf Smith applied for examination and passed, being the first one to be entered in the Register by examination. Dr. Smith continues to lead an active life, although not in practice, and still resides in New Westminster.

The Act of 1886 was later amended in 1898 and an entirely new Act passed in 1909.

In 1912 British Columbia passed the necessary enabling Legislation to permit of the operation of the Canada Medical Act in that province. Since that date practically all names admitted to the Register of the College of Physicians and Surgeons of British Columbia have qualified through holding the L.M.C.C.

(To be continued)

Hospital Service Department Notes

A DEFENCE OF MEDICAL AND HOSPITAL COSTS

The cost of a trip to the hospital is regarded by so many of the laity as an exorbitant and outrageous imposition that any sane comparison of hospital costs with other expenditures considered as essential to one's self-respect (*i.e.*, keeping up with one's neighbours) is welcomed by medical and hospital workers. In his excellent book on *Paying Your Sickness Bills*, Michael M. Davis, Ph.D., quotes the following bulletin issued by a general hospital:

"We will pay \$200 to renew our winter wardrobe and complain of half this amount to restore our health.

"We will pay seven dollars a day for a room at the best hotel, and call the same amount robbery when charged by the hospital, even though board and nursing are thrown in and no tips expected.

"We will lay up \$300 for a modest summer trip, but won't think that the hospital is modest at all if that is all it charges for a trip to the operating room, even though we readily acknowledge that it added years to our lives.

"We will pay \$1,095 for a new car, and then apologize for buying 'a cheap one', but \$1,000 for the skill and weeks of care necessary to save a favourite child looks 'outrageous.'

"We will be too proud to ask aid from parents, brothers and sisters, but not too proud to ask a stranger to carry our financial burden, without even interest on the money, just because that stranger is a doctor or the business manager of a hospital."

FLAT RATES IN THE HOSPITAL

One of the problems facing hospital administrators and their patients has been that of the "extras" which so frequently mount up at an alarming rate, often far exceeding the estimated cost of hospitalization. Naturally, diagnoses may be more intricate than anticipated, and unexpected complications will arise, but patients do desire to have a general idea of what the illness is likely to cost. As a partial solution to this difficulty, the introduction of flat rates has been applied in various hospitals to certain services, such as for tonsillectomies or for maternity care.

A number of hospitals now charge a flat rate for laboratory work. In some this is inclusive of all laboratory work; in others special studies are not included; while in a few a record is kept of the work done and the flat

rate charge (say three dollars) is repeated when the actual services given would amount to a certain sum if charged for at the usual rate (say ten or twelve dollars). These methods take advantage of the insurance idea, for a flat-rate basis is really a scheme of averaging costs and is a great relief to the unfortunate patient requiring repeated and expensive laboratory investigation. The patient admitted for but a day or two is the one to whom such a scheme has the least appeal and in some hospitals some distinction or exemption is made in favour of certain classifications of patients such as overnight accident cases, G.U. series patients, etc. In some hospitals there is a flat rate for the laboratory study of diabetic patients, this frequently being on a weekly basis and entitling the patient to a certain number of blood sugar estimations and urinalyses per week. Any work in excess of this is paid for at regular rates.

An excellent means of giving publicity to this method, which is particularly applicable to the maternity department, has been worked out in a very attractive pamphlet issued by the Moose Jaw General Hospital. In this two-page pamphlet the maternity wing is described and reference is made to its latest equipment; mention is made of the radio ear-phones on each bedside table, and assurance is given that these special rate patients will receive the same excellent service that the other patients receive. Timely emphasis is laid on the importance of pre-natal care and, in order to aid the prospective mother during this period, it is pointed out that the hospital is willing to give free of charge to those who avail themselves of the Flat Rate Scheme such minor services that the attending doctor may deem necessary. In order to take advantage of this arrangement, it is only necessary that the patient pay a deposit of \$10.00 to be credited to her maternity ward account. Should the patient not come to the hospital for her confinement, this deposit is returned, after making deductions for the services rendered at a nominal cost.

The "flat-rate" charge for semi-private accommodation is \$35.00 and for general wards, \$27.50. This includes case room charges, the care of the infant, ordinary medicines and other incidentals and in addition covers hospitalization for a period up to fourteen days. Fifty per cent of the total must be paid in advance and the balance before leaving the hospital. To assist those who desire it, the management will open accounts during the period of pre-natal care, into which patients may pay small sums to be held to their credit. The hospital also emphasizes in this bulletin the very important feature of allowing the mother to bring her baby back to the hospital in order to have it weighed and to have its diet adjusted during the first six months. For

this service a nominal charge of \$1.00 is made.

These flat-rate plans might well be considered in many hospitals. The method should not be termed a cut-rate method of seeking patronage, as is sometimes stated, for it involves sound business principles: averaging of the costs (flat laboratory fee) is a recognized insurance principle; increasing the turnover results in a reduction of the cost per unit service; a steady and known income permits better organization than a fluctuating and uncertain one; the earlier and better collections, with a reduction in bad debts and collection costs, permit a definite reduction in charges. Above all they constitute a real effort on the part of the hospitals to solve the problem of bringing the cost of hospital care down to the level of the average pocket book.

GROUP INSURANCE FOR HOSPITAL STAFFS

A number of hospitals in Canada have systems of group insurance for their personnel and a number of the medical staffs of hospitals have been considering the advisability of some form of insurance for their own members. An interesting arrangement has been in effect at the Mayo Clinic for some time, providing protection for both the medical staff and the other employees. This is described by H. J. Harwick in a recent number of *Hospital Management*. Begun some years ago as a non-contributory life insurance scheme for the non-professional personnel, the plan was enlarged five years ago to include the professional members, with a non-contributory group pure endowment insurance contract maturing at the age of 65, and a group life insurance policy with total and permanent disability benefits. The endowment policy provides for the payment of an amount equal to the annual salary, but not exceeding \$10,000 at the age of 65. In April of 1931 this insurance was further augmented by a contributory retirement annuity contract.

The benefits to the staff member are: life insurance equal to one year's salary (but not exceeding \$10,000); total disability allowance of \$125 and waiving of premiums; endowment at 65 equal to one year's salary; a varying annuity of generous extent (up to \$4,000); in the event of withdrawal all contributions are returned to the member, together with 3.5 per cent compound interest. The Clinic contributes a portion of the cost and the individual member contributes 5 per cent of his salary (the maximum assessment being \$500). Individual members are privileged to make additional contributions not exceeding \$300 per month, thus building up a large annuity at the retirement age. Many members of the staff have taken advantage of this opportunity.

While the salary factor and the contribution of the clinic make this arrangement impracticable for the group insurance of the medical staffs of our average hospital, the principle might be applied with a rearrangement of the method of premium payment. Instead of grading the benefits on a salary basis, the proposal has been made that each member of the staff be permitted a certain range of benefits in accordance with the premium paid.

Medical Societies

THE CALGARY MEDICAL SOCIETY

The members of the Calgary Medical Society listened to a most interesting and instructive address on December 1st, by Dr. Harold Orr, of the University of Alberta. The subject of his address was "Diseases of the oral mucosa". This was illustrated by numerous lantern slides. He stated that diseases of the skin have their counterpart in diseases of the oral mucous membrane. The skin and the oral mucosa have much the same embryological and histological structures. He referred to the wonderful collection of wax specimens in the St. Louis Hospital at Paris, illustrating diseases of the skin as well as of the oral mucosa. Dr. Orr gave a detailed description of each lantern slide shown. Among the many lesions illustrated were the many phases of syphilitic infection, various drug eruptions, including mercurial stomatitis, those due to some of the coal-tar series, lichen planus, erythema multiforme, aphthous stomatitis, diphtheria, Vincent's infection, the so-called "geographical" tongue, ulcerations of the tongue due to cancer, tuberculous ulceration of the hard palate, Fordyce's disease of the lips, nodular disease of the tongue, hairy tongue, kellaris glandularis of the lower lip, kelitis exfoliativa, foot and mouth disease, actinomycosis, sporotrichosis.

Dr. Orr's address was a splendid exposition of the subject, and did much to clarify the difficulties which physicians encounter in making a correct diagnosis in many of the diseases of the oral mucosa.

G. E. LEARMONTH

THE REGINA AND DISTRICT MEDICAL SOCIETY

Medical relief for indigents in the country and in the city was the theme at the December meeting of the Regina and District Medical Society. Dr. O. E. Rothwell, who is a member of the committee of the Council of the Saskatchewan College of Physicians and Surgeons which

has this matter in charge, gave a detailed report of the work done by this committee.

At the meeting of the College in Saskatoon on July 29, just after the federal relief scheme was announced the members felt that a right and proper use of some of the relief money was the defraying of medical bills. At that time it was evident that medical men were leaving the southern part of the province owing to their inability to collect enough to make a living. This was regretted by the Council because it left a number of towns without a doctor. The doctors who remained were complaining about the lack of money.

At this July meeting a committee consisting of Drs. Argue, of Grenfell, Bailey, of Moose Jaw, Eaglesham, of Weyburn, Rothwell, of Regina, and Young, of Saskatoon was appointed. This committee met the government on August 9. After this meeting the premier asked the committee to submit their request in writing to the government in order that the relief commission might take it up. It had been pointed out to the government that this was an emergency situation and that anything done by them now would not be considered a precedent for future actions.

The committee asked that the people be provided some means to meet in part or *in toto* their medical bills, so that the doctors could stay in their communities. The government then asked, "How would you propose to meet this situation?" They inquired whether the doctors would agree to a bonus, and reminded the committee that a sum of money was loaned in 1918-19 to nine members of the profession, who have since repaid it. The committee again stressed the fact that they were not asking for anything for the medical men but for the people, so that they could pay the doctor. The government then brought up the question of the maternity grant (which was called paternalism), which was paid by no other province, and had cost Saskatchewan in five months \$149,000. This they did not propose to continue.

An afternoon session at the annual meeting at Moose Jaw was given over to this question, but no concrete suggestions came out of the meeting. The same committee was reinstated there. Late in September they again met the government and Hon. Mr. Weir, representing the federal government, who reserved his opinion as to what the federal government would do. Investigation had shown that 96 municipalities had been without a crop for three years.

The committee was advised to go to the Relief Commission to present their case, as the federal government were directing how the fund should be used. The Relief Commission finally decided that some form of medical relief would be given to the people in the south. The committee felt that a percentage of all bills

rendered by the doctor would be the fairest way; the doctor would send his bill to the treasurer of the municipality, who would investigate and report to the relief commission. At the first two meetings with the government this seemed to be favoured, but later on it was objected to because it would involve too much expense in administration and because all doctors would not receive an equal amount. On November 16 the commission announced that the simplest way would be to pay a flat rate to the 250 doctors in the areas concerned of \$75 a month.

Dr. A. McIntosh, from Strassbourg, who was present at the Regina District Meeting was asked to tell how this bonus system was working out in the country. He said that if a doctor approached a patient with a bill the patient said, "You are getting \$75 every month from the government for your work, why should I pay you?" Doctor McIntosh said he drove 20,000 miles a year attending patients.

It was generally agreed that the attitude of the government was, "If we do nothing the doctors will still carry on." The medical men have tried to point out that treating the sick is as important as providing food and fuel.

Dr. Hugh McLean reported for the committee who had interviewed the Regina City Council to see what they were going to do for the city indigents. The committee of the city council suggested that the city appoint two medical men to look after all the indigent sick, and that a free outdoor clinic be established at the Regina General Hospital. The objections to this plan were that two men could not look after all the indigent sick; that they could not provide specialist's services; that if the indigent has the right to choose his own grocer why should he not have the right to choose his own doctor; that the medical men already established here were paying increasing taxes to the city, and why should they not reap some benefit from the city's expenditure on medical treatment?

LILLIAN A. CHASE

INHERITANCE OF DEFECTIVENESS.—Most authorities agree that mental defectiveness is inherited, though they hold divergent opinions about the method by which such inheritance takes place. The views of outstanding importance are: (1) that defectiveness is transmitted along Mendelian lines by a single recessive factor or by a number of different factors; (2) that it is largely produced by toxins acting upon the spermatozoon, or ovum, or early embryo, according to the law of blastophthoria.

God, whose law is that he who learns must suffer. And even in our sleep pain that cannot forget falls drop by drop upon the heart, and in our own despites, against our will, comes wisdom to us by the awful grace of God.—Æschylus.

University Notes

University of Manitoba

The Medical Faculty of the University of Manitoba has requested the Manitoba University Council to limit the number of first year medical students. Several factors are back of the Faculty's request. Laboratory and staff equipment and space accommodation in the Manitoba Medical College are sufficient to accommodate a maximum of only sixty first year students. For the past few years the first year class has been from twenty-five to forty per cent higher than could be reasonably accommodated. This year eighty-three students enrolled in the class.

There is also a general problem, said to be common to all medical colleges in Canada and the United States, that more graduates are being turned out than under present economic conditions can be reasonably absorbed. If a limit is set, or standards changed, residence and scholarship are to be the main qualifications for selection.

After reviewing data submitted in support of the request of the Medical Faculty, the Manitoba University Council endorsed the principle, but so far no definite action has been taken.

McGill University

In September the University announced that a Research Institute of Helminthology would be established at Macdonald College and would be financially supported by the Empire Marketing Board, the National Research Council of Canada, and the Province of Quebec. The duty of the Institute will be to combat parasites in livestock, which now effect loss estimated as high as \$20,000,000 in a year. Parasites of sheep, cattle, swine and poultry will receive particular attention.

University of Montreal

Dr. Rosario Fontaine has been appointed as Professor of Medical Jurisprudence and Toxicology, to succeed the late Prof. Wilfrid Derome.

Dr. Fontaine, a graduate of the University of Paris, has been Dr. Derome's assistant for several years and the nomination, in the opinion of university administrators, presents every guarantee of personal and pedagogical worth.

Dr. Albéric Marin has been appointed chief of the Service of Dermatology and of Syphiligraphy at the University of Montreal, succeeding the late Dr. Gustave Archambault, to whom he was assistant for several years.

Dr. J. N. Roy, of the University of Montreal, has been named chief of the eye, ear, nose and

throat department of the Notre Dame Hospital, succeeding Prof. A. A. Foucher.

Queen's University

Of the graduating class in medicine at Queen's University this year, practically one-half have accepted appointments in United States hospitals.

University of Toronto

Dr. J. G. FitzGerald has been appointed Dean of the Faculty of Medicine at the University of Toronto. Professor of Preventive Medicine, Director of the School of Hygiene and Director of Connaught Laboratories, he succeeds Dr. Alexander Primrose, who retired December 31st, 1931. With Dr. FitzGerald will be associated Dr. E. Stanley Ryerson as assistant dean of the Faculty. Dr. Ryerson is at present secretary of the Faculty and Assistant Professor of Surgery. The appointments take effect immediately.

The new Dean of Medicine has a world-wide reputation in Public Health and is a member of the International Health Board of the Rockefeller Foundation. To his initiative and zeal the University owes the School of Hygiene, the money for which was donated by the Rockefeller Foundation and which is now in process of enlargement. Under his direction insulin and toxins and other public health products are manufactured in the Connaught Laboratories.

Dr. FitzGerald was born in Drayton, Ont., December 9th, 1882, received his secondary education in Harriston High School and graduated from the University of Toronto with the degree of M.B. in 1903. He studied later in Johns Hopkins University, in the Pasteur Institute, Paris, in the University of Freiburg, Germany. In 1907-08, he was Demonstrator in Psychiatry in the University of Toronto and two years later lectured in Bacteriology. For two years he was Assistant Professor of Bacteriology in the University of California. In 1913 he was appointed Assistant Professor of Hygiene in the University of Toronto and has been on the staff since.

Dean FitzGerald has written widely on immunity, bacteriology and hygiene. He served during the Great War, first as Captain and later as Major in the R.A.M.C. of the British Expeditionary Force.

The new Assistant Dean is a grandson of the late Rev. Dr. Egerton Ryerson, first Superintendent of Education in the Province. He is Chairman of the Committee on Medical Education of the Canadian Medical Association and also of the Committee on Educational Policies of the Association of American Medical Colleges. He has written widely on medical education and on nursing as well as on the process of diagnosis and on surgery.

Dr. Ryerson was born in Toronto and educated at Upper Canada College and Trinity Medical

College, graduating from the Trinity University in 1900 with the degrees of M.D., C.M. He was appointed to the university staff in September, 1903, became Assistant Secretary of the Faculty in 1908, a position he held until the end of the war, when he was appointed Secretary. He served during the war at Salonika as Major in No. 4 Canadian General Hospital (University of Toronto), and later was Assistant Director of Medical Services of Military District No. 2.

Dr. E. Stanley Ryerson represented the Faculty of Medicine of the University of Toronto at the Annual Meeting of the Association of American Medical Colleges in New Orleans on November 30th, December 1st and 2nd.

An honour was done to the University of Toronto and to Canada by his appointment as Chairman of the Committee on Educational Policies for the coming year. The other members of this Committee are: John Wyckoff, Cornell University; Harold Rypins, Albany Medical College; William Pepper, University of Pennsylvania; and Alan C. Chesney, Johns Hopkins University.

The meeting next year will be held in Philadelphia.

We are pleased to draw attention to the presentation recently made to Professor Henderson for meritorious researches in anesthesia and analgesia.

"This Scroll of Recognition is presented by the International Anesthesia Research Society as a token of the deepest appreciation to

VELYIEN EWART HENDERSON, M.A., M.B., Professor of Pharmacy-Pharmacology, Faculty of Medicine, University of Toronto, Canada, and his Laboratory and Clinical Associates and Co-Workers for untiring years of fruitful researches in the basic science of anesthesia and analgesia.

Especially for researches on ethylene, propylene, methane, dimethyl-ether and cyclopropane as newer anesthetics; also for exhaustive studies in the theories of narcosis and the problems of anesthetic toxicity; experimental investigations of the anesthetic values of nitrous oxid under pressure and the co-administration of carbon dioxid with nitrous oxid; and an exhaustive investigation of the causes of death under ethyl chlorid anesthesia.

Also for his remarkable influence in enthusing his Associates, Co-Workers and Students for research in anesthesia and analgesia as well as for the renown which his work has brought to the Faculty of Medicine of his University; and the benefit it has contributed to the progress of the specialty in its clinical development and the relief of suffering humanity.

In acknowledgement of which the Officers of the Board of Governors of the International Anesthesia Research Society have affixed the

seal of the Society and their names, this fourteenth day of October, nineteen hundred and thirty-one.

JOHN H. EVANS, M.D.,
Chairman.

F. H. McMECHAN, M.D., E. KLAUS, M.D.,
Editor-Secretary-General. Vice-Chairman."

Special Correspondence

The Edinburgh Letter

(From our own correspondent)

Prince George accepted an invitation to formally open the new Falkirk and District Infirmary, which has been erected at a cost of £100,000. The ceremony took place on January 11th. This is the first time that a member of the Reigning House has visited Falkirk since 1914, when the King and Queen made a brief stay in the town. In 1884 Queen Victoria drove through Falkirk, but did not stop. The new Infirmary is one of the largest and most modernly equipped in provincial Scotland. It serves not only Falkirk and District but a considerable portion of East Stirlingshire also.

Next January a Health Exhibition is to be held in Edinburgh in the Waverley Market. This has been organized on extensive lines by Dr. William Robertson, formerly Medical Officer of Health for Edinburgh. The proceeds of the Exhibition are to go to swell the Extension Fund of the Royal Infirmary. Sir James Barrie, Chancellor of the University, has consented to perform the opening ceremony on January 27th. Since his election to the high office of Chancellor, the author of "Peter Pan" has shown his gratitude for the honour done him by his alma mater by his ready response to all requests for his support from the Scottish Capital.

The Prime Minister, the Right Hon. J. Ramsay Macdonald, is to visit Edinburgh on January 28th in order to perform the opening ceremony in connection with the new geology and engineering buildings of Edinburgh University. These form part of the King's Buildings' scheme on the south side of the city. The new building to house the Department of Geology, the erection and equipment of which has been made possible by a gift of £50,000 by Sir Alexander Grant, LL.D., has a frontage of 213 feet. The building has two wings, giving a total depth of 108 feet. It is of sandstone. The new building for the Department of Engineering is of the same materials. Oblong in plan, the front extends to a total length of 200 feet, with a depth of 144 feet. The cost of this building and its equipment was provided for by the Sanderson Bequest of about £50,000 and a grant of

£2,000 from the Carnegie Trust. Sir James Barrie, who is to be present at the Health Exhibition the day previously, is to preside as Chancellor at the opening of the new buildings.

At the Annual Meeting of the Royal College of Physicians of Edinburgh, on December 5th, Dr. Robert Thin was elected *President*. Sir Norman Walker, Drs. Robert Fleming, William Fordyce, Edwin Bramwell, Edwin Matthew, and Fergus Hewat were elected to form the Council. Sir Norman Walker was nominated *Vice-president*. Drs. G. Lovell Gulland and William Fordyce were elected representatives of the College on the Board of Management of the Royal Infirmary. John Wheeler Dowden, President of the Royal College of Surgeons, was elected an Honorary Fellow of the College.

Sir Norman Walker, LL.D., until recently the President of the Royal College of Physicians, Edinburgh, and now Vice-President, has been elected President of the General Council of Medical Education and Registration of the United Kingdom. He succeeds Sir Donald MacAlister of Tarbert, Bart., K.C.B., who has been President of the General Medical Council for 27 years. During 22 of those years Sir Donald was also Principal of Glasgow University. Two years ago he resigned that office and was elected Chancellor. He is an M.D. of Cambridge University. Recently he was elected an Honorary Fellow of the Royal College of Physicians of Edinburgh. One of his most outstanding gifts is his command of languages. He is said to be the master of fourteen. He is a leading authority on the Romany Language, and was responsible for the publication by the Gipsy Lore Society of a set of nineteen poems in Romany. The President of the General Medical Council immediately before Sir Donald MacAlister was Sir William Turner, K.C.B., Professor of Anatomy and later Principal of Edinburgh University. An Englishman, born in the city of Lancaster, he spent most of his medical life in Edinburgh. It is matter of gratification that the General Medical Council on the last three occasions should have gone North of the Tweed in its selection of a President.

Less than two years ago the island of St. Kilda was depopulated and the inhabitants transferred to the mainland, by order of the Secretary of State for Scotland. Recently it has been alleged at a meeting of the Zetland County Council that the inhabitants of Foula are in danger of starvation. Foula is a small precipitous island lying to the west of Shetland, thirteen miles distant from the nearest point of land. Its cliffs are among the highest in Scotland and rise in places to over 1,000 feet. The population at the 1921 census was 149. This year's figure will probably be considerably lower. A small boat conveys mails to the

island every two weeks, but sometimes in winter it is delayed from four to six weeks owing to high winds and angry seas. There was formerly a shop on the island, but this has been given up. In consequence everyone has been running short of meal, tea, sugar, paraffin and other necessities. The statement that the islanders are on the point of starvation is, no doubt, an exaggeration, but certainly there is no surplus of food and other means of subsistence. Many suggestions have been made for ameliorating the condition of the inhabitants. Some people are of the opinion that the island should be evacuated, as was St. Kilda. Owing to its remote and inaccessible position, the Norse language survived on Foula as late as the end of the 18th century, and words and phrases of Norse origin still colour the speech of the natives.

GEORGE GIBSON

23 Cluny Terrace, Edinburgh.

The London Letter

(From our own correspondent)

At the end of November it was announced that a meeting would shortly be held in London, to which consultant and specialist members of the profession residing in the London area were to be invited, to consider a proposal "to provide consultant and specialist services for members of hospital contributory and similar schemes, and to establish to this end a Panel or List of Consultants". The meeting has since been held and a plan prepared by the British Medical Association was approved in principle by 45 votes to 22. This decision is probably more momentous than is generally recognized, for if the scheme works for the special organization for which it is intended, namely "The Hospital Savings Association", it will probably serve as a model for all such schemes, and when, one day, the National Health Insurance includes some consultant services for the insured population a similar plan will no doubt be put forward. It is proposed that the list of consultants willing to see members of the special Association at a reduced fee shall be drawn up and maintained by a Board of Consultants and circulated to all general practitioners practising in the area concerned. To a limited extent an identical scheme has been worked for five years without difficulty in connection with ophthalmic benefit, so that the British Medical Association is not without some experience of "consultants on the panel", as the lay press calls the scheme. At the meeting certain opinions were voiced against the scheme, particularly to the effect that consultants were always willing to see patients at a reduced fee on the recommendation of the prac-

itioner in charge of the case, and a list of specialists would only serve to bolster up a section of consultants unable to stand on their own merits. The Royal College of Physicians appears to view the scheme with benevolent misgivings, but is prepared to support it, and no doubt this view, as expressed by Lord Dawson, will carry much weight with the profession. The general practitioner's view, as represented at the meeting, is in favour of the scheme, so that there is no doubt of its eventually being adopted. Meanwhile young consultants meet round the lunch tables at the Royal Society of Medicine and discuss how much loss of dignity (*i.e.*, going on a panel) is worth financially.

The financial situation has meant that many chronic invalids or imaginary invalids who usually spend the winter at the south of France will have to stop in England this year, and the question of wintering in England has been the subject of discussion by medical men. It is felt that the climate of these islands has been much abused. The President of the British Medical Association points out that while Nice has a daily average sunshine of just under four hours through the winter months, his own town of Eastbourne, on the south coast, has 2½ hours, not nearly so great a difference as is popularly imagined and the daily range of temperature is not nearly so great. Dr. Willoughby probably got to the root of the matter when he said that people going to British resorts required more amenities than were usually provided, not necessarily casinos, but certainly good music and entertainments, while he remarked, in conclusion, that "the hotel people wanted waking up a little". Various practical details were discussed at the meeting, and it was urged that indiscriminate boosting would do more harm than good. It is also important that the situation is not made an excuse for profiteering by hotel authorities, for if the medical profession is really to help it would prefer to see our health resorts standing firm on their own merits when they cease to be protected by circumstances.

Londoners are improving in general physique. This good news is based on some studies by Dr. H. H. Bashford, of the medical department of the General Post Office (but probably better known for his "Corner of Harley Street"). He has compared the height and weight of juvenile entrants to the post-office (boys and girls, aged sixteen) of the present day with figures obtained a quarter of a century ago. Boys weigh sixteen pounds more and are 1½ inches taller than their predecessors twenty-three years ago, while girls are about an inch taller and weigh nine pounds more (after allowing for a decrease in the weight of their clothes) than their predecessors

twenty-five years ago. These figures are all the more remarkable when it is remembered that the present-day group spent their early years of life during the war period. If one searches for the causes of this improvement, one, at least, can be found in the school medical service. In his recent report as chief medical officer of the Board of Education Sir George Newman has told us something of the work done for the five million school children in England and Wales. The gap between our infant welfare schemes and the school medical service, the gap including the toddler of 2 to 5 years, is being slowly bridged and the co-operation of the parent, so important in all preventive medicine work with children, is being satisfactorily obtained. Dr. Bashford's figures may be taken as a fair sample of the population of London and it is hoped that this better physique carries with it increased resistance to disease, for that will be needed in the coming months.

ALAN MONCRIEFF

London.

The Irish Letter

(From our own correspondent)

The problem of tuberculosis still occupies the minds of the public health authorities, both in northern and southern Ireland. In the Free State the government has at last bowed to the pressure of public opinion and brought in a Pure Milk Bill. The promoters of this Bill hope that by its enactment a pure and tubercle free milk supply will be made available for the people, and, by so doing, help to stamp out the large number of patients suffering from tuberculosis so unhappily found in Ireland.

The Medical Officer of Public Health for Belfast, Dr. C. S. Thomson, is making an effort to stamp out the disease within his area. In his Annual Report for 1930, just issued, he lays special stress on the value of a pure milk supply, and further recommends that the notification of early cases of tuberculosis be made compulsory. At present the only cases of tuberculosis notifiable are those in which there is a positive sputum. Dr. Thomson states that if the early cases of tuberculosis were made notifiable, these would automatically come under a municipal system of sanatorium consideration, of "contact" evaluation, and of "housing" scrutiny. He continues: "Early cases of 'consumption' require to be taught a 'way of life', a regime. The line of demarcation between a non-notifiable and a notifiable case must often be a close one. Why not make the disease notifiable in all its stages? Why not cement that close and cordial union between brother private medical practitioner and

official municipal tuberculosis officer even stronger than the bond is welded now? Would not this be a great step on behalf of those in our midst suffering from early tuberculosis?"

In the compressive review of the vital statistics of Northern Ireland, recently published by the Registrar-General, Mr. L. A. Bullwinkle, many important facts are revealed. Of outstanding importance is the statement that in Northern Ireland there is a falling birth-rate. Since 1900 the annual births per 1,000 of the married women between the ages of 15 and 45 have decreased by 20 per cent, although the average age of such marriages does not appear to have increased very materially.

Noteworthy also is the fact that the average age of the population in Northern Ireland is increasing. The review adds: "Although the net effect of natural increase offset by emigration over the past half-century has been to diminish the number of population to a small extent, the average age of the population over this period has steadily increased from census to census until it reached 30.6 years in 1926, which is 2.6 years greater than the average age in 1881. In England and Wales the average age of the population increased from 26.2 years in 1881 to 30.6 years in 1921."

On the subject of the death-rate the review contains many illuminating passages. "The Death-rate in Northern Ireland," it explains, "is also increasing in spite of the fact that the average age of the population is also increasing. Over the past 40 years the standard rates of mortality have decreased by about 35 per cent. Although the mortality of females as a whole in Northern Ireland is now slightly less than that of males, a striking feature is the high mortality of females in Northern Ireland, as compared with that in England and Wales, in spite of the much smaller proportion of urban population in Northern Ireland . . . a circumstance which should have contributed to a lower death-rate here.

"The present generation has experienced a material decline in the death-rate among infants, both male and female. The improvement in recent years, however, is not so manifest.

"The infantile mortality rate, however, is lower in the Irish Free State than in Northern Ireland, a feature which, in part, is presumably due to the higher proportion of rural population in the Free State. If, however, the infantile mortality rates for each county are subdivided and shown separately for rural and urban areas it is found that in the case of urban areas the infantile mortality rates are lower in the North than in the South."

The neglect, or unwillingness, of a large percentage of the population, especially in rural areas, to seek medical aid is reflected by the following extract from the review: "The

extent to which there is a failure to make use of existing medical facilities is indicated by the numbers of deaths which are uncertified, no skilled medical advice having been obtained during the last illness. In some counties in Northern Ireland the proportion of such cases exceeds 25 per cent of the total."

The review emphasized the great reduction in death rates in Northern Ireland over the past forty years and proceeds: "As a measure from birth, the expectation of life has increased between 1891 and 1926 by 9 years in the case of males, and 10.4 years in the case of females. At birth the females' expectation of life is the greater, but when the effect of the high infantile mortality rates amongst males is passed, the male survivors show higher expectations than the females at corresponding ages until age 35 is reached; thereafter the females show the greater expectations."

The Annual Report for 1930 of the Medical Officer of Health for the County Borough of Cork contains some interesting facts as to the value of immunization against diphtheria. A survey was made of the 1,802 children who had been immunized against the disease. Of these children twelve were reported to be suffering from diphtheria, but on investigation ten were eliminated for the following reasons: (a) Four had not completed the treatment (three had only had one injection, and one had only had two); (b) in three cases a period of less than four months had elapsed; (c) in three cases the diagnosis was not confirmed. Thus, out of 1,802 children who had received inoculations, 2 subsequently developed diphtheria, which is equivalent to an incidence rate of 1.11 per 1,000. In the same year 298 cases of diphtheria were notified among the child population (under 15 years) of 22,605, or a ratio of 13.18 per 1,000. The value of immunization in diphtheria would seem to be beyond dispute.

Dr. Patrick T. McArdle has retired from the position of Master of the National Maternity Hospital, Dublin, on completion of the seven years' tenure permitted by the Charter of this hospital. He has been succeeded by Dr. John F. Cunningham, a member of the Royal College of Physicians of Ireland, and Assistant Gynaecologist to St. Vincent's Hospital. Dr. McArdle has returned to active work as gynaecologist in Jervis Street Hospital, where he has been on the staff for twenty-two years.

The financial position of the National Maternity Hospital is a sound one. At the annual general meeting of the Governors, Sir Joseph Glynn, Acting Honorary Secretary, reported that the receipts exceeded those of previous years by £1,090, and exceeded disbursements by £1,643. This happy state of affairs is largely due to the proceeds of the sweepstake on the 1930 November Handicap.

The Senate of Queen's University, Belfast, has appointed Dr. J. S. Young to the Chair of Pathology. Professor Young is a graduate of Glasgow University, and has had an extraordinarily successful career. He was awarded the M.D., with gold medal in 1929, and since then has been in University College, Leeds, as Lecturer in Experimental Pathology and Assistant Director of Cancer Research. He is well known for his work on the factors involved in cellular proliferation. He served in the Great War, first as a private in the Cameron Highlanders, and then, by sheer ability, succeeded in raising himself to the position of Captain and Adjutant of the 1st Black Watch, a position which he occupied on demobilization.

The friendly relationship between the Northern Ireland and Free State Governments has recently been again demonstrated in an arrangement which has been reached between the two governments, in connection with the admission of human remains from Northern Ireland into the Free State for interment. A body removed from Northern Ireland after death for burial in the Free State can now be interred there on production of the certificate of the registrar of deaths of the place where the death occurred, or on the production of a coroner's order. In the case of the removal of a body from a burial ground in Northern Ireland for re-interment in the Free State, it has been agreed that a licence issued by the Northern Ministry of Home Affairs will be sufficient authority to permit the body to be admitted into the Free State and re-interred there.

Sir William de Courcy Wheeler has again drawn attention to the unfortunate position of Dublin, with its obsolete system of multiple small hospitals. There is, he points out, a hospital at the corner of almost every street, each one equipping itself to duplicate the work of its neighbour. Such a system handicaps the work and training of specialists, to whom we look for advances in the science of medicine and surgery. A few years ago an agreement was made to bring about the amalgamation of all these hospitals, but owing to lack of funds this scheme did not materialize. Now, however, with the funds raised by sweepstakes, a golden opportunity has arrived for its realization. The voluntary system of hospital finance has completely broken down, and unless the sweepstakes fountain continues to flow, the uneconomic small hospitals must close. Those responsible for hospital finance should realize that the Government already has its finger in the pie, and, for good or evil, hospitals are heading straight towards State control, and with it compulsory amalgamation.

RICHARD H. HUNTER
20 Haypark Avenue, Belfast.

Letters, Notes and Queries

Sympathectomy for Spastic Muscles

[Dr. E. H. Wood, of Peterborough, Ont., whose article on Thrombo-angiitis Obliterans Treated by Bilateral Sympathetic Ganglionectomy appeared in the October issue of the *Journal* on page 438, sends us the following letter from Mr. W. H. Ogilvie, of London, relative to sympathectomy for spastic muscles, which gives another viewpoint from that expressed in the article referred to. Mr. Ogilvie's letter is published by the request of Dr. Wood.—Ed.]

I have done several of these operations myself when I believed in Royle, and could find no effect whatsoever upon tone. The same experience has befallen several orthopaedic surgeons in this country, and those cases operated upon by Royle himself after careful selection were complete failures without a single saving point. At one time or another, I have met most of the members of the American Orthopaedic Association, and have never yet met anybody who had any use for the operation, nor do I know of any neurologist who accepts the physiology which forms its basis.

I think I can say, without fear of contradiction, that British Surgeons feel that the time has come for plain speaking; that sympathectomy in spastics is useless; that it has no scientific basis; and that it should be abandoned.

If you have any evidence to the contrary, I should be very interested to hear it. With the rest of your paper I am in entire agreement.

W. H. OGILVIE

105, Harley St., London, W.1,
December 5, 1931.

Malaria in Canada

To the Editor:

Mr. Fisk's contribution, in the December number, on *Malaria in Canada*, brings back memories of malaria endemic in at least one part of Canada he did not refer to, up to the ninth decade of the nineteenth century. As late as the later "eighteen-seventies," and earlier "eighties," "ague" or "fever and ague," or, as some new-fangled people called it, "malaria," was still one of the regular components of life, and the commonest summer illness in Tilbury and Raleigh Townships in Kent County, Ontario—and doubtless in adjoining townships also, too remote for us to know, being perhaps fully ten miles away. It must have been the tertian variety, for the

"shake" came every second day. There were stories of the confusion of travellers at seeing people shivering when, considering the weather, they should have burned, and burning when they should have shivered. It was one of the stories about stout-hearted old man Ferguson, one of the first settlers, that he would lean on his spade until the "shake" was over, then go on resolutely with his ditch-digging. Another story—though this has nothing to do with malaria—was that he coaxed himself along that weary ditch by placing cooked potatoes on chips at intervals along its marked-out course, to reward his progress. Perhaps the ditch, and so even the stimulating potatoes, did have something to do with malaria, for it was the digging of many ditches that finally rid the country of that plague.

The chief cause of the endemic malaria there and then, doubtless, was the great stretch of marsh lands all about Lake St. Clair and up the River Thames, locally known as "The Plains". Evidently the anopheles, the "white-hind-footed one," was among the myriads and myriads of mosquitoes bred in those miles and miles of water, muskrats and "plains hay". In the later "eighties" these "plains" were dyked, the dykes cut here and there by steam-driven water-wheels, and soon this great stretch of land, as level as the lake itself, was dotted with farm houses and villages. Then imperceptibly ague vanished, and likely enough by this time is pretty well forgotten.

One of the local "cures" for malaria, by the way, was a decoction of the root of the blue vervain, and it was remarked by people of philosophical turns of mind that this plant, which was the cure, became rare when the disease disappeared. While the mosquitoes were still in full strength, one early settler made a practice of exposing himself naked in the marshes for one day every spring in order to be "bled". He returned in the evening much mosquito-bitten and sun-burnt as to his skin, but doubtless glowing with much inward righteousness over hard duty relentlessly performed.

I was not much interested in those days in the etiology or diagnosis of even malaria. My function, when set astride the old mare, was to trot sedately off three miles or so for medicine to the "Old Doctor" (Dr. Clossen). It was impressed upon my youthful mind, as a last word, that should the "Old Doctor" be away, or, as had happened with other seekers after healing, unwilling to quit his gardening, I was to get medicine from his daughter and house-keeper "who knew as much about these things as the old man himself". To this rural fount of healing, which was not a village nor even cross roads, but a small farm on a back road, as likely as not, others besides my small self might be seen gathering, for there were few households

that were not at least occasionally visited by the fever. Enquiries at the church door in summer about the ague of neighbours were among the bits of good manners that corresponded to the enquiries about colds and chilblains in winter. The medicine I got was in a bottle, but I am sure chiefly quinine. About the time we stopped speaking of ague, and began to speak of malaria we began also to buy quinine pure and direct from a drug store in Chatham with the orthodox trade marks of mortar and pestle without, and coloured bottles within.

This is perhaps all I can say of malaria as it persisted in that corner of Ontario fifty years ago, but I cannot resist the temptation to add a note about the "Old Doctor" himself. He had lost an eye in his student days in a chemistry experiment. That a handicap in an otherwise rather ordinary practitioner, or even a glaring fault such as drunkenness, really tends to found a tradition of unusual skill, is likely a harking back to the time when medicine was *all* mystery and its practitioners almost in the wizard class. At any rate the usual idea was that "but for this the handicap of the blind eye what a very wonderful man he would have been." Such a man was reputed to see more with his one eye than better equipped men with two.

I can remember his not infrequent visits to our home, almost always when the stork hovered, and brothers and sisters were ushered into the family circle. Brought by a kindly neighbour, he was led in from the cold outside, a few ragged coats unwrapped from his bent body, and as many scarves and a shawl unswathed from neck and shoulders. He took off his hinged blue outer glasses, then his inner horn-rimmed glasses, clearer, but too seldom cleaned to be called clear, rubbed his one eye, then the sightless socket, restored both pairs of glasses, stroked his long matted thin hair and professional side whiskers with dark talon-like hands, warmed these hands at the stove while he discussed the weather in a subdued professional manner, then, redolent of all the smells of the pharmacopeia, of stale tobacco, and much *much* besides,—with his own individual mixture of dignity, impishness and affability—proceeded to the bedside. The bodies of his patients he saw through his two pairs of glasses, and with his one eye, darkly, but he diagnosed the inner man perhaps more shrewdly than the outer. If his dull tobacco and general-purpose pocket-knife, used in whatsoever condition it might be found in, did open an abscess badly, his tongue, all agreed, had a much keener edge. Every man and every household of the district, he had summed up in an epigram. But surely someone who still lives among the early traditions of the township of East Tilbury should put down more fully much that could be gathered and told of the "Old Doctor." I have put down as much

as concerns malaria, and a little more for good measure.

D. A. STEWART

Ninette, Man.,
December 20, 1931.

Poliomyelitis

To the Editor:

I would like to make a comment on Dr. Sutton's letter in the January number *re* "Double Doses." I saw a poliomyelitis case on September 6, 1931, early Sunday morning. I was in doubt, as there was no stiffness or pain in the neck or back. I returned in the afternoon and found these present. I got the serum from Dr. Murrow, Owen Sound, a few miles away. I at once gave one dose intravenously and the other intramuscularly. On Monday both knee reflexes were exaggerated; on Tuesday both were quite weak, and there was paresis of the right side, right arm, body and leg, more marked in the anterior tibia. Nowhere was it complete. One marked feature, I thought, was the continued stiffness and pain in the neck and back for about a month after, relieved by aspiration of the spinal fluid, which was under pressure three weeks after the first aspiration, which was done for confirmatory purposes on September 6th by Dr. Jack Middlebro, Owen Sound.

J. McASH.

Tara, Ont.,
January 13, 1932.

A Serum for Alcoholism

To the Editor:

Would you kindly let me know if there is a recognized serum for the treatment of alcoholism? I was told that an article appeared in an English medical journal to that effect.

W. L. CATHERWOOD, M.B.

Galt, Ont.,
November 12, 1931.

[This letter was referred to Dr. David Slight, of McGill University, for reply.—Ed.]

To the Editor:

With reference to an enquiry from Doctor Catherwood of Galt, Ont., regarding the treatment of alcoholism, I would say that I do not know of any recognized serum. Some little time ago statements appeared in the daily newspapers that an Egyptian was treating alcoholism by injecting serum from blisters that had been previously raised in the patient. I should say that this was not a statement of hospital or laboratory work. I believe the "discovery" was credited to a non-medical person.

It may be gratuitous to add this, but it would

seem that any kind of serum can have only a limited place in the treatment of alcoholics. It may be there is a field for work along this line in the stage of acute alcoholism—something to counteract the alcohol *per se*, or the noxious materials that may be formed in the tissues due to the alcohol. I am now referring to the acute physiological changes that are present while the individual is still taking alcohol. The tendency to take alcohol, however, is a very different matter; that certainly is a psychological affair and can only be treated as such. I have heard people talk as if some specific chemical or serological change took place at certain times causing a man to fly to alcohol; why such should exist for alcohol and not for ice cream or tea is never considered.

There is, or was, I hope, a substance sold in Canada some time ago that was being used in drug addiction and alcoholism, even, I regret to say, by otherwise reputable men, and this in spite of the fact that a carefully controlled study made at Bellevue Hospital had shown that the claims made for this material were without justification. This report was published in the *Journal of the American Medical Association*, and I regret it did not find its way into the *Canadian Medical Association Journal*.

DAVID SLIGHT.

Topics of Current Interest

Activities of the British Empire Cancer Campaign in 1930

The annual general meeting of the Campaign was held on July 20 at the House of Lords, with Lord Reading presiding. The annual report, a volume of some 200 pages, takes up the various extensive pathological, experimental and clinical investigations undertaken during the past year by the various centres. Apart from these, among the more outstanding contributions made to the cancer problem by workers connected with the Campaign are the production of cancer by a pure chemical substance, the detoxication of carcinogenic mineral oils, and the demonstration of hereditary factors in certain forms of cancer in human beings.

In Manchester, under the direction of Dr. C. C. Twort, special attention has been given to the investigation of the causes of mule spinners' cancer, and especially to the cancer-producing properties of mineral oils and the possibility of removing harmful compounds from them in such a manner that they can be used commercially without increasing their cost or diminishing their lubricating qualities.

Investigations on the effect of the treatment of mineral oils with sulphuric acid indicate that though a very large quantity of acid must be used in order completely to detoxicate carcinogenic

mineral oils, smaller amounts, such as 5 or 10 per cent by volume, are capable of materially lessening the potency of lubricating oils. The committee recommend that the owners of mills should mix into their lubricating oil the necessary quantity of sperm oil or lanolin, and preferably use mineral oil which is as far as practicable saturated. The practical utility of other methods of detoxication, such as exposure to ultra-violet light and radon, appears to be doubtful.

At St. Mark's Hospital special attention has been directed to the disease known as multiple adenomata, multiple papillomata or polyposis intestini, a condition in which the mucous membrane of the colon and rectum is studded with adenomatous epithelial proliferations.

Investigations have shown that polyposis intestini is an inheritable disease which is transmitted by both males and females, that both sexes suffer from the disease, and that the inheritance can be traced through several generations. If members of these families survive the other complications of polyposis and ordinary risks of life they develop cancer of the rectum or colon, usually in the early thirties or forties.

In the Cancer Research Laboratory of the London Hospital, Dr. T. Lumsden has tested a large number of different drugs, body secretions, radiations, and other reagents such as heat and cold, on tissue cultures of cancer cells and of normal cells. The only reagent he was able to produce which killed cultured cancer cells without damaging normal body cells seriously, was an anti-serum produced by inoculating into an animal the cancer of a different species of animal and then testing this anti-serum upon tissue cultures made from a third species of animal. Unfortunately, however, attempts to apply these results in treating cancerous mice failed, for the anti-serum could not be injected in a degree sufficiently concentrated to destroy cancer without causing the death of the mouse. However, such sera can be separated into fractions of which one fraction contains practically all the anti-cancerous elements in the serum and is much less toxic when inoculated into living animals than the original anti-cancer serum from which it was made. When an implanted tumour is destroyed by inoculating this refined anti-cancer serum into it, gradual reabsorption of the tumour cells occurs and during the process the tumour-bearing animal is rendered immune to recurrences. It is stated that preliminary results of treating mouse cancer, both implanted and spontaneous, raise the hope that ultimate success may be achieved along this line of inquiry, but at the moment consistently good results cannot be achieved. Treatment by anti-cancer serum is not at present applicable to human tumours.

X-rays and radium have been used not only in experimental therapeutics and in the attempt to discover the way in which they act on biological material, but also to test the nature of the material on which they act. At the Middlesex Hospital results appear to indicate that the

Rous sarcoma agent is not of the nature of a ferment; they do not, however, exclude the possibility that it may be a non-living agent of complex protein nature somewhat similar to certain toxins.

Among other inquiries pursued at this hospital are those on the physiological effects of penetrating x-rays on animals; the scattering effects of x-rays and gamma rays in different media; and the reactions of the tissues under different degrees of filtration of radium rays. The best filter for all purposes is held to be platinum. At St. Bartholomew's Hospital the effects of radium on the cerebral tissues of the rabbit are being studied by Dr. E. A. Carmichael and Mr. J. P. Ross. From reports of workers at Westminster Hospital, results obtained with the four gram bomb show that prolonged treatment by this means causes pathological changes in the blood. Histological examination revealed gross damage to spleen, kidney, and lung in every case coming to post-mortem after considerable bomb treatment, while not a single bomb irradiated cancer could be regarded as cured when examined under the microscope, though several cancers of the breast and uterus had been demonstrated to be comparatively inactive after treatment with needles.

Dr. Warnford Moppett, working in the University of Sydney, has continued his investigations into the biological effects of homogeneous beams of x-rays. He has completed studies (a) in relation to a phenomenon termed antagonism, (b) in relation to the area of tissue radiated, and (c) in relation to time. The phenomenon termed antagonism implies a neutralization between different components of mixed radiation in their biological action. He has devised a new type of x-ray tube, made of metal, with which it is possible to obtain a more homogeneous beam of x-rays.

Miss D. Goulston, working at Sydney, had applied the radiations from radium to the chorio-allantoic membrane of the chick embryo. The results of experiments suggest that these results are not due to the gamma radiation from the needles but possibly either to a modified radiation of longer wave length, or an action due to secondary waves originating from the components of the shell.

This report indicates more clearly than any of its predecessors the range and growth of the problem. (Reprinted in part from *The Lancet*, 1931, 2: 207.)

Cancer

There can be but little doubt in the minds of the students of public health that cancer presents to-day the outstanding problem in this field. Mastery has been gained over the various communicable diseases one by one, so that nowadays the practical prevention of most of them is within the power of any society willing to spend the funds for adequate health service. As a

natural result, the advances in preventive medicine and the science of nutrition, the great decline in the infant mortality rate, coupled with a falling birth rate and improved social and economic conditions, have had the effect of adding many years to the expectation of life at birth. Yet, the bulwark of protection which advances in sanitary science have erected against the hazards of the first decades of life seems to have preserved the individual only to subject him to a liability of death from malignant disease which apparently has steadily increased during the period for which American vital statistics have been available; that is, since the establishment in 1900 of the registration area for deaths.

In 1900 when the registration area was first formed, the crude death rate from cancer was 63 per 100,000 population; in 1920, it was 83.4; in 1929 it was 96.1 (the latest available figures), an increase over the crude death-rate of 1900 of nearly 52½ per cent.

In 1929 the total number of deaths from cancer was 111,569. This makes cancer the second most important cause of death. Heart disease alone, with 245,000 deaths, claimed a greater number of victims.

One of the most striking increases in the death-rate has been the so-called external forms of cancer, such as cancer of the breast and mouth, in which, because of the superficial position, errors in diagnosis are few as compared with the possibility for error in deep-seated cancers, such as those of the stomach or other internal organs.

The conclusion has been reached after careful study of statistics that in the 21-year period from 1900 to 1920, about two-thirds of the increase observed in cancer death-rate of persons 40 years old and over was due to an actual increase in the mortality from the disease. For the present it can only be assumed that the increase is bound up in some way in the extraordinarily complex development of our modern social environment. Since physical, chemical and biological processes all tend to a state of equilibrium, we may also venture to hope that the cancer death rate will not continue to grow indefinitely, but in the absence of the discovery of preventive measures will sooner or later become stabilized. The fact of this increase in the cancer death-rate, however, should serve as a spur to stimulate research and to justify its extension.

Cancer is much more likely to make an attack after the age of 35 than before that time, and consequently the death rate is higher in certain age-groups than in others. Among all deaths in men between the ages of 45 and 70, one in eight is due to cancer, and among all the deaths which occur among women between 45 and 65, one in five is caused by cancer. There are no reliable statistics to show how many cases occur apart from deaths.

The most prevalent site of fatal cancer is the stomach, with 38 per cent of the total deaths. Cancer of the breast caused 9 per cent of all

fatal cases. Cancer of the skin caused 3 per cent of the cancer deaths.—*United States Public Health Service*, October 13, 1931.

Vegetarianism and Blood Pressure

The relation between dietetic habits and raised blood pressure is not likely to be a simple one of cause and effect, though excess of food of animal origin, and especially of meat, is often held to favour hyperpiesis. Enough records seem to have been made of men who, on the one hand, have eaten a great deal of such foods without developing any rise in blood pressure and, on the other hand, of men who have high blood pressures in spite of abstemiousness in this respect, to make it certain that other factors play a determining part. It might still be true, nevertheless, that meat-eating in conjunction with other factors makes a person relatively liable to increased blood pressure, and this is the thesis suggested by Dr. Felix Saile as the result of a series of observations carried out during the past two years. He chose for his subject 110 monks belonging to the Trappist, Carmelite, and Carthusian orders, whose rules forbid the use of meat, fish, eggs, and butter, and as controls he employed 115 monks from the Dominican and Franciscan orders, who are permitted to eat meat four and five times a week respectively. The mean blood pressure of the vegetarians was considerably lower than that of the controls at all ages from 20 to 90. The difference was greatest in the age-group 60 to 70, where the mean for the vegetarians was 120 mm. Hg, and for the meat eaters 160 mm. Hg. Interesting as such observations are, they cannot be considered conclusive, a fact which is recognized by Saile himself. The general rules of life differ widely in the two sets of orders. The Trappists, Carmelites, and Carthusians are under a vow of silence, and live secluded lives devoted largely to manual work, or to study and contemplation, as the case may be. The Benedictines and Franciscans, on the other hand, come into closer contact with one another and with the outside world, and live what ordinary folk would consider a much more normal life. It remains yet to be proved, therefore, that the diet of the two groups of orders was the primary factor determining the difference in the average height of their blood pressure.—*The Lancet*, 1930, 2: 200.

Maggots and Osteomyelitis

In the July number of the *Journal of Bone and Joint Surgery* there appeared a posthumous article by Dr. William S. Baer of the Johns Hopkins University, Baltimore, Maryland, under the rather arresting title of "The treatment of chronic osteomyelitis with the maggot (larvæ) of the blow-fly." Dr. Baer's original paper was read before the annual meeting of the American Orthopaedic Association in June, 1930, but his illness and untimely death on April 7th of this

year prevented his preparing it for publication; this has been done by his associate, Dr. George Bennett. Since the days of Ambroise Paré, and very likely before then, observations have been recorded of the healthiness of wounds infested with maggots, and in the American War of Secession one Southern surgeon seems—according to Dr. Baer—to have used larvæ therapeutically. Dr. Baer's attention was drawn to the subject by the discovery in France during the late war of two soldiers who had been missing for days, whose wounds were crawling with maggots. Although these two men had compound fractures of the femur and large wounds of the scrotum and abdomen, and although they had lain on the ground with their wounds undressed for seven days, their condition—so far as infection was concerned—was excellent. This experience set Dr. Baer thinking, and when he was once more able to carry on investigations at Baltimore, he set to work to study the question, and, as far as possible, to reproduce the conditions experimentally. It was found that the naturally grown larvæ of the blue- and green-bottle flies could not safely be employed, as they might have contained pathogenic micro-organisms or spores. Careful and repeated experiments showed that their eggs could be cultured and obtained free from all infection, and that such larvæ could be kept alive and active in wounds for at least five days before they pupated. The paper contains reports of eighty-nine cases thus treated, and Dr. Baer's conclusions were as follows: "(1) Maggots have been found to be a tremendously useful adjunct to thorough surgical treatment of chronic osteomyelitis, and, in our opinion, are *far more successful in securing permanent healing of these extensive wounds than any other method tried by us.* [The italics are ours.] (2) Maggots, by their digestive action, clear away the minute fragments of bone and tissue sloughs caused by operative trauma in a way not accomplished by any other means. This is a tremendously valuable asset in the healing of a wound. (3) Maggots cause wounds to become alkaline, and in this way diminish growth of pathogenic bacteria. (4) Maggots seem to have other more subtle biochemical effects within the wound itself, and perhaps cause also a constitutional reaction inimical to bacterial growth. This is under investigation. (5) Maggots raised and sterilized in the manner described may be used in any wound without risk to the patient. (6) The post-traumatic or post-operative general condition of the patient is better in maggot treatment than in the older forms of treatment where infection was combated by chemicals or other types of dressing. There is less absorption and less toxic reaction. (7) In open tuberculous abscesses, with or without secondary infection, wide exposure followed by maggot treatment has proved surprisingly effective in a number of cases, and will be given further trial." This paper, coming from such an authority, and supported by such an amount of

carefully stated evidence, must attract attention, and further reports will be awaited with interest. —*Brit. M. J.*, 1931, 1: 540.

The Effect of Coffee on the Basal Metabolism

In view of the fact that millions of pounds of coffee are used in the United States alone each year for beverage purposes, it is surprising that so little dependable scientific information should be available with respect to the actual physiological effects of the substance. The most potent constituent of coffee decoctions doubtless is the purine derivative caffeine, which is known as a mild metabolic stimulant. It also modifies the circulation by stimulating the heart and relaxing the vessels by direct action. Excessive doses may produce insomnia, nervousness, headache, palpitation and nausea or vomiting, especially in susceptible persons. As a drug, caffeine is particularly useful in collapse by causing rise in blood pressure. The medicinal dose is usually given as 0.15 g. (2½ grains). A cup of the beverage made from a tablespoonful (15 g.) of ground coffee is likely to contain from 0.1 to 0.2 g. (1½ to 3 grains) of caffeine. Accordingly it is quite conceivable that even the moderate use of coffee should have some action on the bodily functions. In addition to caffeine the decoction contains a substance vaguely described as caffetannic acid, as well as a small amount of volatile oil to which the flavour and aroma are commonly attributed. What physiological effects, if any, are attached to these components remains problematic despite the pseudoscientific claims and the blatant nonsense so widely heralded about the subject. Physicians are continually being importuned to give advice regarding the use or abuse of coffee; and usually they find themselves compelled to repeat traditional admonitions, or to disregard them, as the case may be. The experience of millions of moderate coffee drinkers speaks against any acute dangers or profound damage from the beverage. Obviously, the chronic effects must be subtle and only slowly developed at most. A recently secured illustration of what this may mean has just been published by Helen Hackett from the University of Oklahoma. Because coffee is considered so generally to be a stimulant, she investigated whether the habitual moderate drinking of coffee, say one or two cups a day over a period of years, has any detectable effect on the basal metabolism of young women. All of these were within 10 per cent above or below the standard weight for height and age, and in apparent excellent health, without organic defects that might affect the basal metabolic rate. The coffee drinkers, in these tests, were persons who drank the beverage daily at breakfast and

occasionally at other times. The non-coffee drinkers exhibited an average basal metabolism of 50.2 calories per hour; the coffee drinkers showed, under otherwise comparable conditions, an average of 53.2 calories per hour. The investigation of the college women showed that more non-coffee drinkers than coffee drinkers were found in groups with somewhat low metabolic rates or that the metabolism of the coffee drinkers tended to be higher than that of the non-coffee drinkers. Using the Harris-Benedict prediction figures, the average deviation of fifteen women not accustomed to coffee drinking was -9 per cent; for fifteen coffee drinkers the corresponding figure was -5.1 per cent. These are small differences at most, though Hackett draws the conclusion from them that the drinking of coffee over a period of years has a tendency to raise slightly the basal metabolism of normal young women.—*J. Am. M. Ass.*, 1931, 97: 1391.

Medico-Legal

NEEDLE BROKEN DURING INJECTION: ALLEGATION OF NEGLIGENCE FAILS

The breaking of a needle in the process of injection is not necessarily negligence. The practitioner does not insure his patients against accidents; if the needle is broken and injury is consequently suffered, the practitioner cannot be made to pay damages unless negligence is proved. At the Camelford county court on November 18th last allegations of negligence were made; but the judge, holding that they were not proved, dismissed the patient's action for damages. The plaintiff was suffering from disseminated sclerosis. She was treated with intramuscular injections of sulfarsenol in the right buttock from July, 1927, onwards. At the thirty-fifth of the series (in May, 1929) the needle broke. It was common ground that the doctor at once endeavoured to remove the broken piece. He immediately made a small incision under local anæsthetic. When this operation did not succeed, he forthwith had the patient removed to a nursing home where a larger incision was made the same evening under a general anæsthetic. The missing piece of needle was not found. Next day, and again two days later, x-ray photographs were taken and further probing took place under local anæsthetic. These efforts were in vain. Two months later the patient left the nursing home. Her treatment continued but it has not been possible to localize and remove the broken needle. Subsequently the patient claimed damages for negligence,

which were resisted by the London and Counties Medical Protection Society.

The claim was put forward in two ways. First, it was said, the injection had been made in a hurry and carelessly; the doctor must either have used a defective needle or must have struck a bone; these allegations would establish negligence in the act of making the injection. Secondly, it was said that he negligently failed to remove the fragment. The patient in the witness-box said the doctor had been hurried in his manner and this particular injection seemed to have gone deeper and had given her much more pain than ever before. A general practitioner, giving evidence on the plaintiff's behalf, produced x-ray photographs proving the presence of the fragment in her body. His testimony was otherwise inconclusive. He said the needle might have been defective but he did not know what needle was used nor had he himself ever treated a patient for this disease. He said the needle might have been broken by striking a bone; to strike a bone would, he considered, have been negligent. If the breaking was not due to defect or to striking a bone, it might, he thought, be due to a violent twitching of the muscle by the patient. On the second branch of the case (negligent failure to remove the fragment) this medical witness for the plaintiff said there should have been an operation for removal; the operation could have been—he would not say ought to have been—successful; if it failed, it should have been repeated at the proper time, but he could not say what would have been the proper time. There was also a suggestion that if the defendant did not possess the best possible apparatus for localizing the fragment, he should have sent the patient to Plymouth or any other large centre where special facilities existed.

At the close of plaintiff's case the learned judge was asked to rule that there was no evidence of negligence. With some hesitation he allowed the action to proceed. The defendant doctor then gave evidence describing what had occurred. He denied hurry and explained that, when the patient's muscle was bunched up for the injection, there was a muscular twitch which had the effect of breaking the needle. The needle used was a proper one. As little now remained of the allegations of negligence, plaintiff's counsel was reduced to arguing that the fact of the doctor having given free treatment to the patient in a nursing home was evidence of an admission of liability for negligence. The judge declined to accept this and said it was more easily explained as a generous act. The judge expressed sympathy for the plaintiff, but said he could find no want of the skill expected of a medical practitioner. "The mere fact of

the needle breaking is not necessarily negligence; it might have been a defective needle; it might have been broken by some movement of the patient; it might have been broken because the defendant carelessly and clumsily reached the bone." This last possibility was not proved; it could not outweigh the other two possibilities. He thought the defendant's own evidence probably excluded the possibility of his being found negligent. If, continued the judge, the evidence was equally consistent with neglect and with no neglect, the plaintiff could not possibly succeed in her action.

This claim recalls an Australian case, noted in *The Lancet* last year (August 23, 1930, p. 421) where the defendant doctor attributed the breaking of a needle to a fit of coughing. It was a feature of the Australian case that the doctor, for reasons which he gave, omitted to inform the patient of the accident. Such reasons may exist but a jury would probably draw an adverse conclusion from non-disclosure. Earlier in 1930 (May 17th, p. 1083) *The Lancet* had published certain possible precautions for minimizing the risk of broken needles. The practitioner will naturally desire to avoid accident by all means in his power, but he is not liable for undiscoverable flaws in the instruments he uses nor is he expected to have expert metallurgical knowledge of the qualities and testing of a needle.—*The Lancet*, 1931, 2: 1318.

COMPENSATION FOR DEATH FROM CEREBROSPINAL MENINGITIS

A steamship arrived at Seattle from the Orient, having on board a number of Filipino steerage passengers suffering from cerebrospinal meningitis. After the arrival of the ship, a pipe fitter, in connection with his duties, worked on board the vessel for several days. A week after being so employed he died of cerebrospinal meningitis. The district court held that the deceased employee died from an infectious disease that arose naturally out of his employment and approved an award which had been made under the compensation act.

The court also stated that it appeared under the findings and evidence that the award was within the "accidental injury" phase as well. Concerning this, the court said:

"No doubt, if the body of the deceased had been penetrated by shots from the accidental discharge of a shotgun on the steerage, from the effects of which he lingered and died of blood poisoning, an award would be sustained. By the same token, the discharge of infectious germs by coughing or sneezing on the steerage, some of which penetrated the mucous membrane of the employee, resulting in his speedy death, resulted in accidental injury. In the

one the shot penetrated the muscles of the body, and in the other the germ penetrated the mucous membrane."—*U. S. Pub. Health Rep.*, 1931, 46: 1694.

Abstracts from Current Literature

MEDICINE

Observations on the Etiologic Relationship of Achylia Gastrica to Pernicious Anæmia.
Castle, W. B., Heath, C. W. and Strauss, M. B., *Am. J. M. Sc.*, 1931, 182: 741.

The authors have tested certain apparent exceptions to their hypothesis that pernicious anæmia is produced by an inadequate gastric digestion of protein, thus causing a virtual deficiency of the intrinsic factor (the hæmatopoietic substance) even in the presence of a normal diet. They have been able to show that patients with a severe anæmia of the pernicious type may have normal hydrochloric acid, pepsin, and rennin in their gastric juice and yet lack that intrinsic factor necessary for normal hæmatopoiesis. This investigation was carried out as follows. Beef muscle was given daily for ten days to each of two patients with the blood picture of pernicious anæmia but with an apparently normal gastric juice. No effect on blood formation was noted. As a second experiment the fasting gastric juice of these two patients, secreted after histamine injection, was incubated daily with beef muscle and the resulting material given to two other typical cases of Addison's pernicious anæmia without effect on blood formation in either case. Moreover all cases later reacted normally to liver extract by mouth. They were thus able to demonstrate that the intrinsic factor may be absent even though other secretions of the stomach are apparently normal. The second series of experiments were devised in order to test the gastric contacts of cases of hypochromic anæmia with achylia and non-anæmic individuals having achylia for the presence or absence of this intrinsic factor. They were able to obtain the fasting gastric juice (after histamine) daily from four patients—one with no blood defect and three with hypochromic anæmia. This they incubated daily with beef muscle and subsequently fed to four patients with pernicious anæmia of the Addisonian type. A positive reticulocyte curve, indicating that the intrinsic factor was present, in all cases. They were thus able to demonstrate that the intrinsic hæmatopoietic factor in gastric secretion is not necessarily related to defects in the extrinsic substances namely hydrochloric acid, pepsin and

rennin. The authors have also been able to demonstrate that the intrinsic factor may appear in the gastric juice after the onset of a remission induced by liver extract. This demonstration, however, occurred in a case of Addisonian anæmia having an apparently normal gastric juice. The authors finally put forth the suggestion that in certain cases of pernicious anæmia—and especially in those where diarrhœa is a feature—that there may be difficulty in absorbing the hæmatopoietic substances of gastric origin.

E. S. MILLS

Hodgkin's Disease of Bone Marrow and Spleen without Apparent Involvement of the Lymph Nodes. Krumbhaar, E. B., *Am. J. M. Sc.*, 1931, 182: 764.

Krumbhaar reports the case of a painter aged 55 who was admitted to the Philadelphia General Hospital on November 25, 1924, with a history suggesting cardio-renal disease of six months' duration. Examination showed that he was very anæmic and had a spleen enormously enlarged, reaching to the anterior superior spine. There were no enlarged lymph nodes. There was a left facial weakness. The urinary findings were indicative of considerable kidney damage. The blood showed 1,070,000 erythrocytes, 186,000 platelets, 8,200 leucocytes of which 87 per cent were polymorphonuclears. No eosinophiles were present. In spite of transfusions the patient went down hill and died on March 24, 1925. On February 5, 1925, a second blood count showed only 3,700 leucocytes—no eosinophiles and only 54 per cent polymorphonuclears. At autopsy there was evident cardio-renal disease but the striking features in gross were the enlargement of the liver and spleen. On section the spleen was not greatly altered but the liver showed small whitish areas throughout.

Histological examination of the liver was not remarkable but no section was made of the pale nodules. The striking histo-pathological change was in the spleen and bone marrow. The splenic pulp showed a scarcity of Malpighian follicles. There was slight but definite increase in the fibrous tissue matrix of the organ and the sinusoidal endothelial cells were cuboidal, not flattened. In some areas of pulp eosinophilic myelocytes constituted half the cells found. The next most prominent cell was the pleomorphic large Hodgkin cell. Occasionally Dorothy Reed cells were encountered. The bone marrow of the femur had the appearance of solid tissue, such as lymph node. It was made up almost entirely of hæmatopoietic cells and fibrous tissue. In places the cellular reaction as noted in the spleen was present. It differed from the spleen in that the fibrosis was much more advanced. The absence of lymph-node involvement and the apparent

origin of the disease in this case in the bone marrow suggest that the disease is one of the hæmatopoietic or reticulo-endothelial systems rather than of lymphoid tissue.

E. S. MILLS

Ventricular Paroxysmal Tachycardia. McMillan, T. M. and Bellet, S., *Am. Heart J.*, 1931, 7: 70.

The authors present a case of ventricular tachycardia occurring in a pregnant girl of sixteen with an apparently normal heart. Cæsarean section was successfully performed during the tachycardia, which failed to disappear on the termination of gestation. Tincture of digitalis up to a point of toxicity had but little effect. Quinidine was then administered and after a total of 35 grains in three days, a constant and normal rhythm was restored. After omission of the drug the paroxysms recurred. The attacks continued to be controlled by quinidine, 5 grains four times a day. It is pointed out that this condition is not so rare as previously assumed. The authors have encountered 13 cases among 16,000 electrocardiograms from 6,500 patients.

W. H. HATFIELD

The Electrocardiographic Findings Following Ligation of the Descending Branch of the Left Coronary Artery in Man. Purks, W. K., *Am. Heart J.*, 1931, 7: 101.

A most interesting case is reported in this article. A male, aged 18, suffered a stab wound in the left chest, penetrating the right ventricle near the interventricular septum and severing the descending branch of the left coronary. An operation was performed and the artery ligated with complete recovery. Electrocardiograms were taken just prior to operation, immediately following, and at frequent intervals thereafter. There was found to be an elevation of take-off of the T wave in lead 1 and depression of the R-T interval in lead 3 within ten minutes after operation. Maximum changes occurred in forty-eight hours. In leads 1 and 2 it became iso-electric in 12 days, inverted in 10 days, and upright in 77 days. The Q-wave in lead 3 increased in size, exceeding 25 per cent of the R-wave from the fourth to sixth day, with slight slurring at its apex.

W. H. HATFIELD

Congenital Idiopathic Hypertrophy of the Heart. Sprague, H. B., Bland, E. F. and White, P. D., *Am. J. Dis. Children*, 1931, 41: 877.

These authors report a case of congenital idiopathic dilatation of the heart, in which from a 7 months' infant, a heart weighing 175

grams was removed at autopsy. The normal weight for the heart at this age is 34 grams. The child was not thought to be growing normally at the age of 3 months, and at 6 months showed spells of quick breathing accompanied by cyanosis. The skin was dry and became easily cyanotic on exposure to cold, the muscles were hypotonic, the tongue was protruding. Hypofunction of the thyroid was diagnosed, and small doses of thyroid extract given. The child got worse, and at 7 months, showed a bulging left chest, diminished breath sounds on the left, an enlarged heart, and a blowing systolic murmur. The child died at 7 months, and a heart five times the normal weight was found.

The family history was of interest, for the child immediately preceding this patient in the family had died at 5 months of exactly the same condition. A half sister of these two children, aged 10, had been diagnosed in infancy as a case of congenital heart disease, and when seen by the authors was diagnosed as a case of patent ductus arteriosus. The maternal aunt of these children had a severe disease of the heart subsequent to rheumatic fever at the age of 12. The mother's father was not known to have any heart disease, but he dropped dead at the age of 67. His twin sister died at 12, of some chronic heart disease, the exact etiology of which was not known. The sister of these twins, hence the mother's aunt, was normal, but ten of her daughters died in infancy of heart disease, or in convulsions. The mother of the twins, and the great-grandmother of the two patients with congenital enlargement of the heart, had had heart disease most of her life.

It is recognized that there is a grave danger in discussing heredity in heart disease, without knowing what the pathological basis of the condition was, but a family in which six members at least, and presumably more, had heart disease and in which two sisters had outspoken congenital enlargement indicates that there was here present a factor or factors in the germ plasm making for abnormal heart development.

MADGE THURLOW MACKLIN

Nanismo hypofisario y diabetes insipida (Hypophyseal dwarfism with diabetes insipidus).

Diaz, J. H., *La Medicina Ibero*, Nov. 21, 1931, 2: T XXV.

The author describes a case of pituitary dwarfism of the Lorrain type accompanied by diabetes insipidus. The patient, a child of eight years, received a blow upon the bregmatic region of the skull at the age of nineteen months. This was followed by a large hæmatoma locally which underwent suppuration. From the age of two years there was very little growth and sub-

sequently the eyes began to protrude. Polydipsia and polyuria occurred from the age of five years onwards. At the age of eight years the child had the stature of a four year old one. The features were cretinoid, the eyes protruded, with a low, unwrinkled forehead. The upper eyelids were œdematous, the teeth small, and the ears large. The genitalia were overdeveloped and there was a minor degree of hirsutism. There was an overdevelopment of the skeletal musculature, even for a child of eight years. The basal metabolic rate was -8, and following the injection of 0.5 c.c. of adrenalin, it rose to -2. X-ray of the skull revealed a greatly enlarged sella turcica. Eye examination showed a sluggish reaction to light in the left eye and to accommodation in both. The right fundus showed some swelling of the disc with engorgement and tortuosity of the veins. The Wassermann and Kahn reactions were negative. The blood sugar curve ranged from 110 mg. per 100 c.c. to 160 mg. per 100 c.c.

Diaz draws the following conclusions:— (1) In diabetes insipidus there is a disturbance of the pituitary (posterior portion) or of the floor of the third ventricle; (2) the polyuria is the result of a renal effect produced through the pathways of the autonomic nervous system; (3) the diabetic features, e.g., glycosuria, *et cetera*, result from involvement of the liver.

HARRY DAVIS

The Significance of the X-ray Picture in the Prognosis of Influenzal Bronchopneumonia.

Eimer, K. and Kastermann, E., *Zeitschrift. f. klin. Med.*, 1931, 118: 323.

During a minor influenzal epidemic in the winter of 1930-31, the authors observed 28 cases with lung complications, of which 5 were fatal. Three of the fatal cases were frank cardiac deaths and showed, clinically and from x-ray, varying degrees of cardiac dilatation. The only two fatalities were in young adults in whom the roentgen-rays revealed a diffuse miliary infiltration involving the greater part of each lung. In addition, there was an increased density around the hilus, due to swelling of the hilus glands. None of the other cases showed this miliary appearance but had more or less definitely localized bronchopneumonic patches in some portion of a lung. In their conclusions, the writers recognize and point out the value of other prognostic points, such as the general condition, age, duration of illness, *et cetera*. It is their belief that the prognosis is unfavourable in the presence of: (1) miliary bronchopneumonic infiltration without a tendency to localize and hilus gland swelling; (2) marked cardiac dilatation; (3) a tendency to pleural or pericardial effusion.

HARRY DAVIS

SURGERY

The Significance of Fat Embolism. Vance, B. M., *Arch. Surg.*, 1931, **23**: 426.

In this contribution Vance deals *in extenso* with the subject of fat embolism. He defines it as "that condition which occurs when a liquid oil enters the circulating blood and is transported in globules large enough to obstruct the lumen of blood vessels in different parts of the body." The two varieties now recognized are: (1) the pulmonary form, in which the emboli obstruct the smaller blood vessels of the lungs; (2) the cerebral form, in which the arterioles in the different organs, especially the brain, are blocked. The author attempts to discover how true the theory is that fat embolism may occur from causes other than injury. The study is based upon a number of routine necropsies from the office of the Chief Medical Examiner of New York City. There are two main classes of conditions associated with fat embolism. In the first are true etiological factors, such as injuries to the adipose tissues of the body and the intravenous injection of oily substances. The traumata to the adipose tissue include: (1) injury to the osseous system, (a) fractures of bones, (b) jarring of the skeleton, and (c) orthopaedic operations; (2) injury to subcutaneous and inter-muscular fat; (3) injury to fatty viscera. In the second class are those of doubtful significance including (1) burns; (2) post-mortem processes; (3) poisons, in natural causes of death.

Three requirements are necessary to produce fat embolism from adipose tissue. (1) the force must so injure the envelope of the fat cell that liquid fat is set free; (2) the force must tear small veins in the vicinity of the liquid fat; (3) some mechanism must be present which will drive the liquid fat into the open ends of the torn veins, and so introduce it into the general venous circulation. These factors are present in all cases of fat embolism due to injury. They are especially applicable where the skeletal bone marrow is involved.

Vance concludes that fat emboli are of frequent occurrence after injury to fatty tissue, especially in the shafts of the long bones. The grade of embolism is slight in most cases, which indicates that the protective mechanism of the organism works with sufficient efficiency to prevent the absorption of fat into the blood stream in any considerable amount. Fifty-nine cases of fracture of the bones of the extremities are analyzed, and show about 75 per cent positive for fat emboli and 25 per cent negative. Only 3 cases were fatal. Fat emboli could be demonstrated in the arterioles a few minutes after a fracture, and such emboli could be found rather consistently in the lungs during the first seven days after the injury, and only occasionally

after this period. The clinical diagnosis is seldom made because of the rarity of this complication and since the symptoms may be attributed to some other condition in the body; especially is this so with the cerebral type, if there is an associated head injury.

G. E. LEARMONTH

Plasma Cell Tumours of the Nasal and Nasopharyngeal Mucosa. Claiburn, L. N. and Ferris, H. W., *Arch. Surg.*, 1931, **23**: 477.

According to Ewing, these tumours, to which little attention has been given, occur chiefly in the nasopharynx, alveolar borders, tongue, lips, and cervical lymph nodes, as well as in many other regions. There is a relatively slow course. They may recur after removal and become associated with a chronic cachexia. They are usually classed as lymphosarcoma, but as a rule are benign with very indistinct neoplastic properties. It is important that they should be separated from the malignant lymphosarcoma. The structure shows a diffuse growth of more or less typical plasma cells.

The authors review twelve cases from the literature, and record two of their own involving the nasal and nasopharyngeal mucosa. The first was in a man of 34 who complained of "nose trouble", which had been present for years. An examination of the nose demonstrated an irregular, grey tumour mass which filled the entire interturbinate space in the right nasal fossa and appeared to arise from the turbinate bones. The entire tumour was removed.

There was no recurrence one and a half years after operation. Examination of the tumour showed in some of the microscopic preparations the external surface of the tissue to be partially covered by a thin layer of stratified squamous epithelium. Numerous fibrous trabeculae were beneath this layer and contained oval or spindle cells with homogeneous grayish-blue cytoplasm and spherical nuclei. The chromatin of these nuclei had a radial arrangement which gave the so-called "cartwheel" appearance. These appeared to be typical plasma cells. In no area did the plasma cells appear to invade the septa of fibrous tissue. The structure suggested an inflammatory rather than a neoplastic growth.

The second case occurred in a man of 60, who gave a history of obstruction in the right side of his nose with a moderate post-nasal discharge. Ten months previously he had had a small tumour removed from the right nasal fossa, diagnosed clinically as a fibroma. Some relief followed the operation but the tumour recurred. On examination, both inferior turbinates were enlarged and the right middle turbinate moderately hypertrophied. In the right nasal cavity a raised somewhat lobulated

tumour mass was present, extending from the middle meatus over the middle turbinate. A similar tumour, but smaller, extended downward from the fossa of Rosenmüller on the right. The tumours were removed by means of a snare, followed by irradiation of the sites of the growths. Several months later there was no recurrence. Examination of the microscopical sections from the growths showed marked variation in size and shape of the plasma cells, with many giant forms, often multinucleated, which the authors believe is evidence of the neoplastic nature of the tumours.

G. E. LEARMONTH

OBSTETRICS AND GYNÆCOLOGY

The Value of Hypertonic Glucose Therapy in Pre- and Post-Operative Conditions. Polak, J. O., Mazzola, V. P. and Zweibel, L., *Am. J. Obst. & Gyn.*, 1931, 22: 817.

It is the right of every prospective patient to have painstaking study before she submits to any elective operative procedure. Pathological conditions, fatigue, undernourishment, chronic anæmia, and endocrine imbalance lower the resistance to infection and favour acidosis. The three conditions which attend all operations in varying degree are shock, dehydration and acidosis. In traumatic shock, where the blood pressure falls to a very low reading, the introduction of 50 or 100 c.c. of a 50 per cent solution of glucose will raise the pressure from 15 to 50 mm. within a period of four or five minutes. This rise is maintained from twenty to thirty minutes, when there is a slight secondary drop, followed by a gradual rise in both the systolic and pulse pressure. These observations have been confirmed in the animal as well as by more than 200 studies in the human being. The following conclusions are drawn. Shock, dehydration, and acidosis are preventable in the majority of cases. In shock the plasma-volume and cell-volume must be restored by prompt treatment, either by direct transfusion or by the intravenous injection of hypertonic glucose solutions. The blood chemistry is but temporarily changed when relatively large quantities of concentrated glucose are used and the excess is spilled over into the urine, and intravenous injections of hypertonic glucose definitely raise blood-pressure and pulse-pressure, and increase the circulating volume of blood.

ROSS MITCHELL

Endometriosis and Endometriomata. Dougal, D., *Brit. M. J.*, 1931, 2: 929.

Endometriosis is defined as the pathological state brought about when endometrial fragments invade the uterine wall or, passing through the Fallopian tubes in regurgitant

menstrual blood, reach the pelvic cavity and the structures within it. Cullen's diverticular and Sampson's retrograde menstruation and cellular-spill theories provide the most reasonable explanation of the uterine and extrauterine endometriosis respectively. Endometrioma is defined as one of the tumours which develop when misplaced endometrial fragments or implants proliferate sufficiently to form clinicopathological entities, and is accepted as the most suitable term to apply to all such tumours, whether uterine or extrauterine.

The number of endometriomata producing symptoms is considerable. Operations for removal of these tumours amount to 11 or 12 per cent of all abdominal operations carried out during sexual maturity. Symptoms due to endometriomata are: lower abdominal pain, dysmenorrhœa, menorrhagia or epi-menorrhagia, backache, dyspareunia, marked constipation, shooting pains extending into the uterus and vagina or, occasionally, down one or other leg, when an ovarian endometrioma is adherent to the pelvic wall. Physical signs are more characteristic, such as fixation of the uterus and ovaries, associated with a shotty nodular tumour behind the cervix. Endometriomata usually cause sterility. Conservative measures of treatment are only possible in the early stages and even then the chances of recurrence are considerable. In Dougal's series the uterus and all ovarian tissue were removed in 83 per cent of cases.

ROSS MITCHELL

UROLOGY

Urinary Diseases in Pregnancy. Crabtree, E. G. and Prather, G. C., *J. Urol.*, 1931, 26: 499.

It is now generally recognized that pelvic and ureteral over-distention exists in all pregnant women as a result of a tight fitting fetus in an inelastic abdomen. The course of the ureter over the bony pelvis, the ligaments of the uterus, the fascial layers, etc., conspire to produce a preponderance of right-sided changes. The occurrence of acute infection increases obstruction and enlarges the dilatation of the pelvis and ureter. Changes occur both in primiparæ and multiparæ. In the latter they frequently become very large due to the fact that with many pregnancies in rapid succession there has been inadequate time for the restoration of the kidneys. The changes apparently occur about the fourth month and all patients show stasis from the fifth month on. The change is always most marked on the right side, regardless of the position of the fetus.

There is a characteristic change in the ureters. The dilatation is accompanied by a corresponding lengthening of the tube. The excess length forms an arched curve away from the spine. In

addition, these ureters show kinking at the pelvic brim and in the upper third. These deformities however return to normal in the first few months after delivery if the inflammatory change has not been too severe, but the post-partum kidney is a definite entity which must be watched. Pyelographic evidence shows that immediately after delivery atony of the pelvic and ureteral musculature exists, and, though the residual urine is at once reduced, the pelvis remains for a time distensible far beyond the normal capacity without pain, while forcible distention will produce the typical deformity of pyelonephritis in pregnancy. Usually near the end of the third month the post-partum kidney has returned to normal, the rate of retrogression depending on the degree and duration of overdistention and above all upon the frequency of pregnancies.

The most outstanding symptoms of urinary tract disease in pregnancy are those of a pyelonephritis irrespective of the underlying disorder and hence it is most important that accurate diagnosis be made. The same diagnostic measures may be carried out as in the non-pregnant and surgery is not contraindicated where needed. One of the most important duties is the differentiation of kidney infections from pelvic infections and this has been a great help in the clinic. The number of cases of pyelonephritis of pregnancy which demanded hospitalization have been greatly reduced since hygienic measures have been established aiming at kidney protection. The most important of these is water drinking and the second is the early institution of treatment where pyuria or fever appeared. The patients are warned to report at once chills, fever or pains in the kidney regions. They are put to bed, with fluids forced to 150 ounces per day, and when free from symptoms are referred to the urological clinic for diagnosis. In this way nearly all the uncomplicated cases are managed through the clinic without admission to hospital. The very severe cases that are admitted to hospital are treated with forced fluids, alkalies and rest in bed. Posture has little influence. If temperature persists cystoscopic treatment is used. The pelves are drained and washed with boric solution and 3 to 5 c.c. of 1 per cent silver nitrate instilled. The catheter is left in place for 15 to 20 minutes and never retained longer.

Hydronephrosis existing prior to the onset of pregnancy is apt to be aggravated and, if it becomes infected, to go on to rapid destruction. The same is true of renal anomalies, e.g., aberrant vessels which as the result of overdistension become a destructive agent. In this type of case plastic surgery offers aid. Stone is not very common and in many cases there is a calculous pyonephrosis when first seen. Interruption is preferable before nephrectomy.

Small calculi usually are masked by symptoms of pyelonephritis. If they become lodged in the ureter the dilatation often facilitates pushing them back, as they are not readily passed. If impacted, ureterotomy may be done, but the extreme Trendelenburg must be used because of the enlarged uterus and vessels about the lower ureter. Eighteen cases of solitary kidney have been encountered and all carried through pregnancy easily but one. In these cases uroselectan has shown the pelvis and ureter to be unusually active. Tuberculosis developing in pregnancy is apt to be of a fulminating nature. Chronic renal tuberculosis usually weathers a pregnancy. In all cases post-delivery care is most important, and if pyuria or bacilluria persists thorough investigation should be carried out. In this way many interesting anomalies are found.

N. E. BERRY

Osseous Metastasis in Carcinoma of the Prostate. O'Crowley, C. K., Trubek, M. and Goldstein, H., *J. Urol.*, 1931, 26: 665.

Two cases are reported in which there was almost generalized metastatic skeletal involvement without symptoms referable to the urinary system. In both, the original diagnosis from the x-ray was Paget's disease, though the characteristic skull changes were absent. In both cases, however, the metastatic lesions were of the osteoplastic type described by Von Recklinghausen as a carcinomatous osteitis. The more usual picture is that of bone absorption. In spite of the increase in the amount of bone the occurrence of multiple pathological fractures was evidence of faulty ossification. In each case there were no symptoms directly referable to the urinary system, and no striking changes on rectal examination. The initial symptoms were sciatic pain. Though the metastases were extensive, there was no marked anæmia in either case and no immature cells in the peripheral blood which might suggest a severe drain on the blood-forming organs. In one case the spleen and liver had reverted to their embryonal functions, undergoing myeloid metaplasia; in the second case the distal bones of the extremities had become active in blood cell production.

Aside from the regional lymph-nodes there were absolutely no metastases in any tissues outside the osseous system. It seems difficult therefore to explain the mode of dissemination. It would seem most likely that the first entrance to the bone marrow is by way of the pelvic lymph-nodes, and thereafter the osseous dissemination may continue quite independently of the systemic vascular or lymphatic channels.

N. E. BERRY

ORTHOPÆDICS

The Diagnosis and Frequency of Tuberculous Disease of the Knee. Sundt, H., *J. Bone & Joint Surg.*, 1931, 13: 740.

For doctors in earlier times things were in many respects considerably easier than for us. For them a tumour albus, or white swelling of the knee, was tuberculosis; and a chronic hydrops genus was "water on the knee", and both they and their patients were satisfied with that knowledge. It is otherwise now; both we, ourselves, and our patients of to-day demand to know more. In this extremely interesting and instructive article the question of diagnosis of chronic knee lesions is studied, with special reference to the proof of tuberculosis. Clinically, a tuberculous knee is either a white swelling or a chronic hydrops (water on the knee). We cannot tell clinically whether it is that or not. Every test for tuberculosis may play us false in some particular case. The only laboratory test that establishes the diagnosis is the guinea-pig test, and this is inconclusive when negative. Even a repeatedly negative test may occur in a proved tuberculosis case. In thirty-two cases negative to guinea-pig test, six subsequently revealed tuberculosis on microscopical examination.

The positive Pirquet test is important only up to three to four years of age. In a child of this age with a tumour albus or hydrops, when any other infection can be ruled out, a positive Pirquet reaction will decide the diagnosis in favour of tuberculosis with a degree of probability bordering on certainty. After three to four years, 50 per cent of children give a positive reaction. A negative Pirquet, perhaps from cachexia, does not bar out the existence of active tuberculosis. The only convincing proofs are the absolutely negative result of all tuberculin tests up to ten milligrams, or, on the other hand, a focal reaction that is objectively and subjectively positive. Such tests are not devoid of danger. It must, however, be noted that a focal reaction can be obtained by non-specific substances, *e.g.*, typhoid vaccine or boiled milk, etc., while also focal reaction on injection of tuberculin has been obtained in foci of non-tuberculous nature. Alan Smith, in 1924, reported a case of sarcoma of the lower end of the femur which showed a positive focal reaction to tuberculin; whereas, in cases of undoubted joint tuberculosis, he obtained no reaction. An undoubtedly positive focal reaction is no certain proof of the presence of tuberculosis.

The value of x-rays in diagnosis is much over-estimated. A tuberculous knee, it is well known, may show a negative x-ray. Nor do periosteal deposits always speak for syphilis or osteomyelitis. There is no x-ray picture entire-

ly typical of tuberculosis. Extensive osseous changes as sequestra or foci may not show a film, owing to their being poor in calcium. "We cannot practise pathological anatomy with the x-ray film." The sedimentation-rate test has not helped much, though it is not without importance. The tuberculosis Wassermann test is unreliable and even misleading. A negative reaction is valueless. A strongly positive reaction in puncture fluid or a more strongly positive reaction in puncture fluid than in the blood must be regarded as decisive, just as is the case with a Wassermann in joint syphilis.

Dr. Sundt upholds exploratory arthrotomy to settle the diagnosis, especially in adults. After an exploratory operation one can be sure of the diagnosis almost always—in cases treated conservatively one makes many mistakes in diagnosis. Sundt points out that in about 30 to 50 per cent of the non-tuberculous knees, the cause of the arthritis was uncertain. In some cases with a negative Wassermann test a cure was obtained by anti-syphilitic treatment. In other doubtful cases one thinks of chronic effusion due to epiphysitis, to tonsillar and dental infection, and to Poncet's tuberculous rheumatism.

J. A. NUTTER

A New Operation for Arthrodesis of the Shoulder. Gill, A. B., *J. Bone & Joint Surg.*, 1931, 13: 287.

In this report Dr. Gill describes an improved operation for arthrodesis of the shoulder. By it the acromion process is made to bury itself in a deep trough in the head of the humerus, thus ensuring bony union. This would seem to be a great improvement on the old way of simply securing apposition of these two bones, previously denuded of cartilage. A horse-shoe incision is made, encircling the acromion from front to back, and from the point of the shoulder a second incision is carried downward from the middle of the first. The upper part of the capsule is removed, with the exception of its origin from the humerus, which is used to suture head and acromion together. The acromion is denuded of periosteum above and below, that above being also kept for suturing purposes. Glenoid and head are rawed, and a deep cleft made in the humeral head. Into the cleft, with the arm at 45° abduction and some forward position, the acromion is introduced and maintained firmly by sutures. Arm and hand and trunk to pelvis are put up in plaster, thus securing firm shoulder-fixation. A window over the shoulder allows for dressings; 45° abduction of the arm is sufficient. After 12 or 14 weeks union is firm and the patient uses the arm. The operation is done from ten years upwards. In cases of shoulder tuber-

culosis no attempt is made to fuse the head of the humerus and glenoid.

This operation is indicated also for infantile paralysis and for some cases of brachial paralysis, whether due to birth or other trauma. May the reviewer add that it is of use in chronic non-tuberculous arthritis of the shoulder?

J. A. NUTTER

Prophylactic Treatment of the Free Callus in Articular Trauma of Children. Rovirkalta, Emili, *J. Bone & Joint Surg.*, 1931, 13: 697.

The danger to joint function in articular fractures of children is pointed out. This is largely due to excessive callus formation following both fracture and operative reduction. To avoid this one needs frequent anæsthetics and the avoidance of violent mobilization or too early massage. The elbow in childhood is particularly liable both to fracture and to excessive callus formation, and warning is given against too favourable a prognosis in joint injuries here, even when the x-rays do not reveal severe lesions. Profuse callus formation may follow the simplest dislocation. Two cases are illustrated of stiff elbow due to excessive callus. This was removed by operation and the joints treated by x-rays to prevent reformation of callus. The results were most satisfactory.

J. A. NUTTER

OPHTHALMOLOGY

Exophthalmos Associated with Diabetes Insipidus and Large Defects in the Bones of the Skull. Wheeler, J. M., *Arch. Ophthalm.*, 1931, 5: 161.

Exophthalmos, large defects in the bones of the skull, and diabetes insipidus, make up a syndrome of interest to all clinicians. It is of prime importance to ophthalmologists because the striking tell-tale sign is the exophthalmos, and because the optic nerve and retina may become involved with consequent impairment of sight. The exophthalmos may be so great that impairment or loss of sight may result from exposure of the cornea. Given a child with unilateral or bilateral exophthalmos without evident cause, the ophthalmologist may well think of the possibility of Christian's syndrome. Let him palpate the skull for possible defects in the bone particularly around the orbit. Let him subject the patient to roentgen examination of the head and of the hip bones if he wishes, and the roentgenologist may demonstrate areas of loss of bone that cannot be discovered by palpation. Let him think of the possibility of excessive thirst, of excessive urine, of low specific gravity. With the condition well in the ophthalmologist's

mind, the diagnosis of the syndrome is easy. Wassermann tests of the blood and the spinal fluid have not been positive in any case. Tuberculin tests in the few cases in which they have been tried have given no positive reports.

At present one has a right to a mental picture of a neoplastic or neoplastic-like process involving structures in the floor of the third ventricle, possibly involving the hypophysis and other nearby cerebral structures, invading the orbit, and involving the bones of the skull and perhaps others.

With reasonable assurance, the diabetes insipidus can be accounted for by disturbance of the cerebral tissue in the floor of the third ventricle, with or without invasion of the hypophysis. The defects of the bone are probably due to true invasion by the hyperplastic process. The pronounced exophthalmos is probably never due to mere loss of bone of the roof and other bony parts of the orbit, but to true invasion of the orbit by the hyperplastic process.

Invasion of the hypophysis may occur, with or without erosion of the sella turcica. If the hypophysis is injured, asexuality, dwarfism, and other evidences of interference of function may result.

S. HANFORD MCKEE

Fundus Changes in Leukæmia. Larsson, S., *Acta Ophthalm.*, 1930, 8: 22.

In 14 cases of leukæmia, 7 being of the lymphatic type and 7 of the myelogenous, Larsson found fundus changes in 10 cases, consisting of 5 of each group. Typical leukæmic retinitis associated with papillœdema was observed in 3 cases of lymphatic leukæmia, and 1 case of myelogenous showed definite swelling of the disc and retinal hæmorrhages. The presence of swelling of the disc in these 4 cases led the author to lumbar puncture in order to determine whether increased intracranial pressure was present in them. This he found to be the case; lumbar puncture performed on one of the remaining 10 cases which did not show swelling of the disc gave a negative result. In none of the 4 cases with swelling was the kidney function quite normal, though none of them showed increased blood pressure. The author argues that the essential condition in leukæmic retinitis is papillœdema, modified in its appearances by the fact that the pressure produced on the retinal vessels by swelling of the disc gives rise in such cases to a characteristic picture, the basis of which is the excessive tendency to hæmorrhages that leukæmic cases show in general. The papillœdema itself he regards as due to increased intracranial pressure. Larsson draws a parallel between these cases and neuroretinitis of nephritis. He recalls that in vascular hypertension and in

nephritis papilloedema may exist with or without any fundus changes. When retinal involvement is present its appearances are determined by the state of the retinal vessels, papilloedema in a fundus with normal vessels, following a different course from that seen in the fundus of a nephritic.

In all these cases the uniform cause of papilloedema operates on differing background, producing different pictures. The essential similarity of fundus changes in leukæmia and nephritis is also reflected in the pathology of these diseases, in both there are changes in the blood and blood vessels: in both some cases show increased intracranial pressure; kidney deficiency may be present in leukæmia as well as in nephritis. The primary cause of fundus changes in both these conditions is probably increased intracranial pressure produced by changes in the blood pressure and in the vessel wall. In the absence of increased blood pressure in leukæmia retinitis, the author sees evidence for this factor being only a concomitant condition and of subsidiary importance in the development of neuro-retinitis in kidney disease.

(From a review in the *Brit. J. Ophthalm.*, June, 1931, p. 352.)

S. HANFORD MCKEE

PATHOLOGY AND EXPERIMENTAL MEDICINE

Tumour Immunity, Lumsden, T., *J. State Med.*, 1931, 39: 577.

We review a portion only of a paper entitled "The problems of cancer treatment and research, with special reference to tumour immunity", from the pen of the Director of the Cancer Research Laboratory of the London Hospital. Dr. Lumsden dismisses, as not convincing, the evidence adduced in favour of a specific causal agent of cancer, except perhaps insofar as a parasitic organism may act as one of many varieties of irritation or repeated damage. Nor does he believe that disturbances of endocrinic secretions explain the onset of cancer. He would give less attention to the search for a growth factor, and more to the mechanism by which the body controls growth and determines the cessation of healing and the replacement of damaged cells. Studies of the reaction of tissue cultures of cancer and normal tissues to various reagents have yielded some very interesting data. Serum of an animal highly immunized against a foreign cancer has been found to yield three different factors, each of which is toxic to the antigenic cancer cells but only one of which is specifically so. The factor derived from the euglobulin fraction is of particular interest. This fraction contains practically all the anti-cancerous elements in

the serum and is much less toxic than the original anti-cancer serum from which it is made. An implanted tumour may sometimes be destroyed by inoculation with the refined anti-cancer serum, the tumour cells being gradually absorbed, and during the process the animal is immunized so that recurrence cannot take place, nor can it be subsequently rendered cancerous. Preliminary results of treating mouse cancer, spontaneous or implanted, encourage the hope that success may be achieved along this line of enquiry, although thus far consistently good results have not been obtained. There appears to be some yet unknown factor, the presence or absence of which determines success and may account for the variability of results. This unknown factor is being sought for.

W. H. HATTIE

Experimental Referred Pain from the Gastro-Intestinal Tract. Part 1. The Œsophagus. Polland, W. S. and Bloomfield, A. L., *J. Clin. Invest.*, 1931, 10: 435.

About twenty years ago, Sir James Mackenzie introduced the problem of the interpretation of clinical symptoms. He believed that the correct explanation of symptoms would be of great value in the diagnosis of disease. Unfortunately this very significant lead has not been capitalized by investigators. The present piece of work, however, deals with a subject emphasized by Mackenzie—the nature and location of symptoms resulting from irritation of the digestive tract. Polland and Bloomfield, from Stanford University, present in this report the results of experiments in which the Œsophagus was stimulated in different parts of its length. The method employed was the inflation of a soft rubber balloon which was attached to the end of a mercury-weighted stomach tube. The latter was marked off in centimetres from the end, so that the authors knew with reasonable certainty the approximate location of the balloon. The amount of air used to inflate the rubber bag was measured, as was also the pressure in the whole system. In all, 191 inflations of the Œsophagus were performed.

It was found that the vast majority of sensations from the Œsophagus were referred to the anterior chest, but particularly to some area about the sternum. Thus in 135 instances the discomfort was localized at either the suprasternal notch or the area of the xiphoid cartilage. In a few instances, the sensations were referred to the back. The authors did not discover any relationship between the part of the Œsophagus stimulated and a corresponding skin segment. Thus inflation of the balloon in the lower end of the Œsophagus might produce pain in the episternal notch. Moreover,

pain might be referred to various parts of the thorax following stimulation of the same portion of the œsophagus. As a general rule, pain was felt when 15 to 25 c.c. of air were introduced into the rubber bag, and when the pressure was between 80 and 150 mm. of mercury. Only a few cases showed significant variations in this respect in one or the other direction. An inquiry into the character of the sensation elicited by inflation of the œsophagus revealed almost as many replies as there were patients. An important conclusion in this regard was that pain failed to be a constant accompaniment of the sensations complained of. In 5 of 13 patients who had had epigastric distress the process of inflating the œsophagus caused the appearance of a paroxysm of pain or discomfort similar to the spontaneous one.

The authors display a shadow of disappointment in their summary, inasmuch as their results did not occur with physiological precision. However, they themselves point out in another paper that the subject of pain in the human being depends upon a good many factors which we may not be aware of at present.

J. FEIGENBAUM

NEUROLOGY

Neurosis in Childhood. Allen, I. M., *Brit. J. Child. Dis.*, 1931, 28: 177.

This is a careful study of 169 consecutive cases of neurosis in childhood as seen in the Out-Patient Department, National Hospital, Queen's Square, London. Twenty-two illustrative case histories are abstracted. The clinical features and important points in the history fall into two groups, *viz.*, those related to the *background* and those relating to the *exciting cause*.

Concerning the former it is most important to recognize the part played by (1) physical and mental disabilities. These render the child less able to wrestle with the problems of environment, partly because of the disability itself and often because of parental overprotection engendered by the disability. (2) Biochemical disturbance such as relative carbohydrate starvation is a possible, but not common factor. (3) Physical habitus is of importance—children with long narrow bodies, little subcutaneous fat and clear skins are ready subjects. (4) Position of the child in the family is of great importance, almost 90 per cent of the cases being in only children, the youngest child, or in children isolated by three or more years from the next child. (5) Father-deprivation, with consequent development of exaggerated mother-child relationship, was responsible in 5 per cent of the cases. (6) Lack of, or improper, parental training is a fruitful cause. (7) Maternal inexperience in association with a strong sense of responsibility and resulting in over-solicitude is important.

Among causes precipitating the neuroses, the following were noted as of importance: (1) The

birth of the next child. (2) Illness in early childhood. (3) Re-arrangement of the family, as by the appearance of a step-parent. (4) Failure of social adaptation in the first attempts to mingle with other children. (5) Starting to school. (6) School discipline. (7) Illness in an older child. (8) Surgical operation. (9) Accidents. (10) Fire or fear of fire (one might add fear of death). (11) Onset of puberty. (12) Economic difficulties. (13) Direct suggestion by the parent. Among the clinical features in order of frequency, the author noted fear and apprehension; emotional disturbances; sleep disorders; behaviour disorders; unpleasant habits; tics; general ailing; backwardness at school; speech disturbances; enuresis; hysterical attacks and choreiform movements. In diagnosis, physical conditions, congenital abnormalities, minor degrees of mental deficiency and various disorders such as petit mal, narcolepsy and chorea, must be watched for.

Treatment will be (1) prophylactic, including correct training of both child and parent. (2) Symptomatic—by training, mild sedatives and hydrotherapy. (3) Psychological—by investigation and correction of abnormal attitudes in child, parent or teacher.

A. T. MATHERS

Neurologic Phenomena during the Treatment of Diabetes. Criscitiello, M., Jr. and Messer, E. R., *New Eng. J. Med.*, 1931, 205: 1246.

The authors submit the report of an interesting case of diabetes during the treatment of which marked neurological disorders appeared. The patient, a woman, having digressed from her diet, developed coma and was vigorously treated with insulin. Early in treatment she complained of headache, weakness, etc., but in the third week she began to have transient recurrent attacks of numbness and weakness in the right arm and leg with difficulty in speech. This later developed into a complete right hemiplegia of such grade as to suggest a sub-cortical lesion, probably vascular. There was complete recovery within twenty-four hours. The late development of the neurological symptoms and signs is explained as due to hypoglycæmia produced by hyperinsulinism. With increased activity, when the patient was up and about in the third week, more sugar was utilized and an excess of insulin left free in the blood. The authors are at a loss to explain the reason for the sharp localization of the disturbance. The report is timely in that cases of the type or resembling it closely are being noted elsewhere.

A. T. MATHERS

HYGIENE AND PUBLIC HEALTH

Controlling the Maladies of Middle Life. Dublin, L. I., *Am. J. Pub. Health*, 1931, 21: 479.

Dr. Louis I. Dublin, in an interesting paper read at the last annual meeting of the American Public Health Association, discussed public

health service from the point of view of sound investment.

Dr. Dublin stated it as his belief that three-quarters of the present deaths from tuberculosis, which are still close to 100,000 a year, could be postponed for shorter or longer periods; that when our present knowledge regarding the care of certain types of pneumonia is put into operation on a large scale, we should succeed in reducing the number of deaths from this disease by one-third to one-half. Pædiatricians agree that the deaths from diphtheria can be virtually eliminated, and safety engineers are very confident of their ability to reduce by a quarter the number of accidents in industry, in our homes, and on our highways.

Touching upon the all-important question of the maladies common to middle life, Dr. Dublin says:

The great problem still remains how best to prevent and treat the ailments of middle life, namely, heart disease, Bright's disease and cerebral hæmorrhage; but even here progress is being made. Information as to the causes leading to these degenerative conditions is increasing. It is not too much to expect that a perceptible proportion of deaths can be postponed for a time at least.

For these reasons, I estimate that the expectation of life can be increased by more than 5 years provided the knowledge now available be utilized by health organizations, public and private. The expectation of life in the country as a whole can be extended to a span of at least 65 years. This is not an idle dream, for it has virtually been done in far-away New Zealand. Progress will go considerably beyond this point; exactly how far, will depend upon new discoveries in preventive medicine in our laboratories and clinics.

Heat Cramps in Industry: Their Treatment and Prevention by Means of Sodium Chloride.
Glover, D. M., *J. Indust. Hygiene*, 1931, 13: 347.

Painful and disabling muscular cramps are common in workers who must carry on their occupations under conditions of unusual heat. As early as 1892 the phenomenon was described by Coplin *et al.* in sugar refinery workers and 12 years later Edsall devoted considerable attention to the subject. J. S. Haldane is credited with the suggestion that the cramps are due to salt loss. In the process of sweating a very considerable amount of salt is lost (as much as 2 or 3 grams per hour), and when the water loss is made up by copious draughts of water, the salt deficit is not affected. For some time it has been the practice of certain miners to drink water in which small quantities of salt had been dissolved (10 gms. per gallon). This has produced very encouraging results.

Among the workers of the Otis Steel Co., and the United States Aluminum Co., in Cleveland, a good many cases of muscle cramps used to

occur. Some of these cases were quite severe, resulting in loss of time; others were less severe, but all of them resulted in some disability and caused concern to the Companies. In 1926 a start was made in treating the cases with salt solution. Relief in most cases was immediate. It seemed logical, in view of these results, to apply the treatment prophylactically, and so the workers exposed to high temperatures were encouraged to use salt with their drinking water as a routine. After various methods were tried and found unsatisfactory, tablet-dispensing machines were devised which delivered 16 grain tablets. The machines were placed by the drinking fountains and placards were placed advising the men to use a tablet every time they took a drink. After this system was adopted the occurrence of muscle cramps practically ceased.

The author believes that his observations have demonstrated the value of salt both in preventing and relieving the condition. An extensive bibliography is attached.

FRANK G. PEDLEY

Rabies without History of Bites. Hurst, E. W. and Pawan, J. L., *The Lancet*, 1931, 2: 622.

The full title of this interesting paper is "An Outbreak of Rabies in Trinidad without History of Bites and with the Symptoms of Acute Ascending Myelitis". Seventeen cases are recorded as having occurred in the village of Siparia and its neighbourhood, of which 13 occurred in the summer of 1929, 3 in the summer of 1930, and 1 early this year. All cases resulted fatally. The condition was at first thought to be acute poliomyelitis, as in the earlier cases no sensory changes were detected. In some cases there was difficulty in swallowing, but hydrophobic symptoms were never present in the earlier stages, although in the later stages of this year's case the doctor in attendance suggested, on account of the spasmodic difficulty in swallowing, that it seemed like hydrophobia. The authors describe the clinical and laboratory investigations which led them to conclude that the condition was rabies, and that a disease simultaneously prevalent in cattle and thought to be botulism was also rabies. They suggest tentatively that the vampire bat may have been the vector of infection to both man and animals.

Paralytic rabies has, of course, been described by other writers, and is the form normally found in herbivora and rodents. Monkeys inoculated with emulsion of spinal cord of one of the patients (before the diagnosis of poliomyelitis had been abandoned) reacted in a puzzling way, but in other animals, inoculated from them, the symptoms were typical of rabies. A virus was ultimately obtained which bears a close relationship to the *virus fixé* (Paris strain). And from the brain of a cow thought to be suffering from botulism, a similar virus was obtained, while typical Negri bodies were found in the cornu ammonis of a second cow. No connection could be traced between the animal and human cases. Reasons

are given for suspecting the vampire bat to be the vector.

W. H. HATTIE

RADIOLOGY

Roentgenologic Study of Intra-thoracic Lymphoblastoma. Kirklin, B. R. and Hefke, H. F., *Am. J. Roentgenol.*, 1931, 26: 681.

Diseases which attack the lymphatic system primarily are designated as lymphoblastoma or malignant lymphoma, comprising mainly the lymphosarcomas and lymphogranulomatous conditions (Hodgkin's Disease) but including also the various leukemias. It is difficult clinically to differentiate Hodgkin's disease from others in this group. However, the treatment is along the same lines and the prognosis is practically the same.

The series in this study is comprised of 67 cases, including 40 cases of Hodgkin's disease, 17 cases of lymphosarcoma, and 10 of leukemia, all proved by biopsy or necropsy.

Evidence of thoracic involvement was discovered in routine roentgenological examination in 49 per cent of cases of Hodgkin's disease of any part of the body where the diagnosis had been proved. Thoracic involvement was found in 20 per cent of cases of proved lymphosarcoma. The authors' cases of Hodgkin's disease are divided into two groups: (1) Those in which the nodes only are attacked; (2) those cases which show involvement of lung tissue, either by infiltration or metastases; 62.5 per cent of this series belonged to group one and 32.5 per cent to group two.

In the first group the x-ray shadows showed lobulation of the margins of the mediastinal shadow. This lobulation tended to approach a straight line following x-ray treatment. Displacement of the mediastinal structures was found to be a rare finding.

The second group showed infiltration of the lung in 12 cases, or 30 per cent; metastases which could be recognized as such were seen in only 5 cases. In this series the most common x-ray feature of Hodgkin's disease was bilateral lobulated widening of the mediastinum. The appearance was similar in 10 out of 17 cases of lymphosarcoma. The cases of leukemia showed appearances which were very little different.

Thus, x-ray examination of the chest in cases of Hodgkin's disease, lymphosarcoma and leukemia does not permit a precise diagnosis, and they must therefore be grouped together, as stated in the first paragraph.

A. STANLEY KIRKLAND

The X-ray Treatment of Hodgkin's Disease.

O'Brien, F. W., *Radiology*, 1931, 17: 1197.

Hodgkin's disease is defined as that particular clinical syndrome, febrile or afebrile, acute or chronic, but always fatal, which has rather a definite blood picture, and, objectively, has its

beginning in one or more lymph nodes or some part of the auxiliary lymphoid system. Whether it is a malignant tumour or an infectious granuloma remains unsettled. If anything is to be said one way or the other, it is that Hodgkin's disease more closely approaches an inflammatory disease, in that it maintains its histological individuality through all changes of environment. Ewing is quoted as saying that "tuberculosis follows Hodgkin's disease like a shadow". The primary focus at the time of discovery may be almost anywhere in the body, in spite of the fact that our conception of the disease makes us think of it as involving lymph nodes. Secondary anemia is a regular accompaniment of the disease. Early in the disease the leucocyte count is nearly normal, but later there is an increase in the total leucocytes.

Most agree that irradiation seems the better method of treatment, offering in the majority of cases definite palliation and not only retardation of the growth but an improvement in the general health.

The author has lately been using 185-200 K.V. with 1 m.m. Cov. and 1 m.m. Al. filtration in fractional doses, being guided as to dosage by the response of the localized lymphomatous masses, the systemic reaction, and the blood.

The so-called prophylactic radiation has not been used because in this disease one usually is treating a patient already prostrated. If the provocative agent in this disease is finally shown to be the tubercle bacillus, it would then seem necessary to employ heliotherapy much more generally than is now the practice. It is impressive that so little is known about a disease described so long ago; how difficult it is to appraise values when one reflects that our knowledge of its histopathology is current with our present century, our knowledge of the blood picture coincident with the world war, its therapy a contemporary problem.

A. STANLEY KIRKLAND

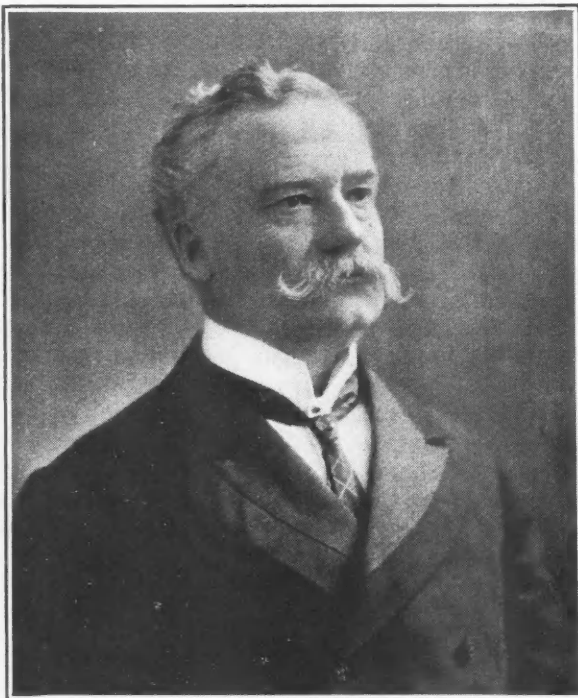
AN EARLY USE OF LIVER.—In Philip Kruseman's Medical Art Calendar, commented upon editorially in our January issue, is a reproduction of a painting by Nicolaas Knupfer, called Young Tobit and his Bride. The legend given runs thus. "Seven lovers already were killed by the devil, who had fallen in love with the bride. Young Tobit, however, succeeded with assistance of the Angel Gabriel, who burned heart and liver of a haddock, to beat the devil and to rescue his young bride." There is an error here. It was not the Archangel Gabriel who did this but the Archangel Raphael. The proper version, as given in the Apocrypha (Tobit, VIII, 2-3) is this. "As he went, he remembered the words of Raphael, and took the ashes of the perfumes, and put the heart and the liver of the fish thereupon, and made a smoke therewith. The which smell, when the evil spirit had smelled, he fled into the uttermost parts of Egypt, and the angel bound him."

Obituaries

Dr. James Algernon Temple. On December 6, 1931, at his residence, 186 Warren Road, Toronto, James Algernon Temple passed away in his eighty-ninth year after a few hours' illness.

A few years ago Doctor Temple's sight became seriously impaired, due to an optic atrophy associated with hyperglycæmia, and in 1929 he underwent an operation for vesical calculus and prostatic trouble. About the same time he suffered a great sorrow in the death of his beloved and devoted wife which occurred after a prolonged illness. Notwithstanding his physical disabilities, his mental faculties remained clear and active to the last; he was always bright, interested and cheerful, and remarkably so, as he was up and about during the day of his last illness.

For over sixty years Doctor Temple was an outstanding figure in the medical life of Toronto and



Dr. James Algernon Temple

during that time no one attained a higher place in the confidence and esteem of the medical profession. His reputation as a practitioner brought him a very large and influential clientèle, and his former students spread his fame as a teacher and surgeon throughout the Province of Ontario and in more distant parts where they settled. He had retired from active practice some fifteen years ago but never lost interest in his profession or its affairs.

Doctor Temple was born on August 6, 1843, the fifth son of the late Major Henry Temple, of His Majesty's 15th Regiment, and Maria T., daughter of the late Hon. Jonathan Sewell, Chief Justice of Lower Canada. He received his early education in the High School and Laval University in Quebec, entered McGill University as a student in Medicine in 1862, and graduated in 1865, receiving the degree M.D., C.M. He continued his medical studies in England, qualifying as a member of the Royal College of Surgeons in 1865, and was elected a Fellow of the Obstetrical Society of London in 1872. After completing his studies in England he served for four years as Medical Officer in Her Majesty's Civil Service in India.

In 1869 he married Alice Erie, daughter of the Rev. W. H. Heu de Bourck, of Taunton, England, settled

in Toronto, and entered upon private practice in association with the late Dr. Edward M. Hodder, Dean of the Faculty and Professor of Obstetrics in Trinity Medical College. He soon attained a place in the first rank among the medical practitioners of Toronto and after Professor Hodder's death in 1878 succeeded him in the chair of Obstetrics and Gynæcology in Trinity University and as Gynæcologist on the staff of the Toronto General Hospital. As a lecturer and clinician, his thorough knowledge of his subject, his intense earnestness, his capacity for eloquent, clear, forceful exposition, his apt illustrations derived from a wide and varied practical experience, all deeply impressed the students who thronged his classes, so that his reputation and influence as a lecturer spread far beyond the limits of the wards and classroom. He was a pioneer in abdominal surgery in Toronto, in which he established a wide reputation for skill and resourcefulness, though always tempered by a wise conservatism.

Dignified and courteous in bearing, Doctor Temple was respected and esteemed by his confrères and students as a high-minded and honourable man, and by the public as a worthy representative of the physician of the old school, who loved his profession, maintained its highest ethical standards, and devoted himself faithfully to the service of his patients and the community.

The esteem and confidence in which he was held both personally and professionally is shown by the many positions he attained and the honours he received at the hands of his confrères. As dean of the Trinity Medical faculty, in succession to the late Walter B. Geikie, he took an active part in bringing about the union of the medical colleges in Toronto in 1901, and on its consummation he became Professor of Obstetrics and Gynæcology in the Medical Faculty of the University, holding the appointment until his resignation in 1910. In recognition of his services to the University and his eminent professional attainments he received the honorary degree of LL.D., in 1905.

In addition to his university and hospital appointments, Doctor Temple was president of the Ontario Medical Association (1889-90), and first president of the Toronto Clinical Society, in 1892. He was also a member of the Council of the College of Physicians and Surgeons of Ontario from 1902 to 1906, a member of the Executive of the Victorian Order of Nurses, and one of the original Fellows of the Academy of Medicine. Masonry was his chief interest outside his profession. He was a Past Master of Ionic Lodge of Toronto. During the past winter he occupied the Master's chair at a special meeting.

Doctor Temple is survived by seven children: Dr. Charles Temple, of Toronto; R. H. M. Temple, K.C., General Solicitor of the Canadian National Railways, Montreal; Gordon C. Temple, of Orillia; Mrs. Carter Troop, of Toronto; Mrs. Selby Martin, of Toronto; Mrs. W. F. V. Atkinson, of Quebec, and Mrs. J. N. B. Colley, of Toronto.

At a meeting of the Board of Governors of the University of Toronto, on December 10, 1931, it was resolved, "that the Board, having learned with deep regret of the death of Dr. James Algernon Temple, Professor and Head of the Department of Obstetrics and Gynæcology from 1901 to 1910, and sometime member of the Senate, desires to place on record an expression of its appreciation of the distinguished services he rendered the University, and to convey to the members of his family its deepest sympathy with them in their bereavement." The Board directed that this resolution should be placed on its minutes as a permanent record of its recognition of Dr. Temple's worth as a citizen, of his eminence as a medical practitioner, and of his valuable services in the sphere of medical education, and that a copy should be engrossed and forwarded to the members of his family.

H. B. ANDERSON

Dr. Daniel T. Crawford, a graduate of Toronto University in 1896, died at Hanna, Alta., recently. He first settled in Innisfail in 1903, having registered with the College of Physicians and Surgeons of the North-West Territories in that year. He leaves a wife and a large family to mourn his loss. One of his sons, Wilfred Alexander, graduated from Toronto University in 1927 and is now practising at Woodville, Ont.

Dr. Sidney Nixon Davis, of Welland, Ont., aged 63, died at his home of pneumonia, on December 31, 1931. Doctor Davis was born in York, Haldimand County, in 1868, and attended Caledonia High School, then entering Queen's University for the study of medicine. He graduated in 1891 and established practices at York, Cayuga and Parry Sound. He located in Welland in 1912, and, with the exception of the war years, had been here ever since. He was interested in the Welland County General Hospital, and for a number of years represented the medical profession on the institution's Board of Governors. He was one of the Coroners for Welland County. Doctor Davis was a staunch advocate of Empire principles, and always associated himself with any movement for community betterment. He was a member of the Masonic Order, being affiliated with a lodge at Parry Sound.

Doctor Davis enlisted in January, 1916, with the 114th Haldimand Rifles and went overseas the same year, holding the rank of Major and Second in Command. On the reorganization of the Canadian forces overseas he joined the Canadian Army Medical Corps and served in France and England. He returned in 1919.

In addition to his widow, Daisy Maud Davis, four sons and one daughter survive. They are: Cecil R., Toronto; A. E. N. Davis, William A. and Patrick, all of Welland, and Miss Mary Florence Davis, at home. Two brothers and two sisters also survive, Arthur F. Davis of Chicago, Herbert H. Davis of Montreal, and Miss F. Davis and Miss M. Davis, both of Hamilton.

Dr. Henry Egerton Day, of Kingston, Ont., a specialist in children's diseases, was found dead beside his automobile in his garage on December 14, 1931. He left his house about midnight on Sunday intending to be out for only a short time. The members of his family retired to bed and were not aware until the following morning that he had not returned. When he was found, the motor of his car was not running and the door of his garage was open. He had been troubled with his heart for some time and death has been ascribed to heart failure.

Doctor Day was born in Kingston Township in 1877 and was a son of the late Mr. and Mrs. Sidney Day. He entered Queen's University and graduated as M.D. in 1902. He practised at Odessa for seven years and then took up general practice in Kingston. About twelve years ago he began to specialize in children's diseases. During his residence in Kingston Doctor Day did a great deal of gratuitous work among children for the Victorian Order of Nurses and the Infants' Home. For two years he represented Frontenac Ward on the Board of Education. He is survived by his wife and three daughters, Hilda, Alice and Elizabeth at home; and one brother, A. E. Day, K.C., of Kingston.

Hon. Dr. Forbes Elliott Godfrey, who, until September, 1930, had been Minister of Health and Labour in the Ferguson Government, died after a prolonged illness on January 6, 1932, in Toronto. Doctor Godfrey was born in York Township on March 31, 1868, the son of Rev. Robert Godfrey and Mary Elliott. His preliminary education was received in Owen Sound and he graduated in Medicine from the University of Toronto (M.B., 1889) with the General Proficiency Medal. Then, proceeding to Scotland he pursued post-graduate studies

and took the qualifications of L.R.C.P. & S., Edinburgh, and L.F.P. & S., Glasgow. Returning to Canada, he settled in Mimico, Ont.

Public life always held a fascination for Doctor Godfrey. After his medical practice was assured, he became more and more prominent in Conservative circles in West York. Finally, in 1907, following the death of Hon. J. W. St. John, Speaker, and then member for York West, he was elected as the Conservative member. He was re-elected in 1908, 1911, 1919, 1923 (including the by-election necessitated by his appointment to the Cabinet), 1926 and 1929. He held a seat in parliament for a longer continuous period than any other member. As Minister of Public Health and Labour Doctor Godfrey pioneered enactment of anti-tuberculosis and industrial health legislation in Ontario.

Dr. Godfrey was a director of the Toronto Casualty, Fire and Marine Insurance Company, and had been terminal surgeon of the Canadian National Railways at Mimico for twenty years.

In 1894 he married Mary M. Carson, daughter of James Carson of Newbridge, Ont. One daughter was born, Constance, wife of Dr. Warren Snyder. Both survive him.

Dr. Norman Kitson McIvor, of Winnipeg, died in the Misericordia Hospital on December 30, 1931, after a brief illness and was buried the following day in Old Kildonan cemetery, not far from his birthplace. He was descended from Selkirk settlers and his father, for many years prominent in the fur trade, named him after the pioneer steamboat operator on the Red River. Born in 1875, he was educated in Winnipeg schools and the University of Manitoba, graduating in medicine in 1908, when he won the University silver medal for highest standing in the year. After graduation he began practice in Winnipeg, meeting with considerable success until he enlisted for active service in 1916. He proceeded overseas as senior Major of the 12th Field Ambulance, C.E.F., and saw service on the Somme with that unit. Later, he was attached to No. 3 Casualty Clearing Station and No. 1 General Hospital, but ill health compelled him to be invalided home in October, 1917.

In the spring of 1918 Doctor McIvor was appointed Unit Medical Director at Winnipeg of the Invalid Soldiers' Commission, which later became the Department of Soldiers Civil Reestablishment and still later a branch of the Department of Pensions and National Health. Consequent on the spirit engendered in the great general strike in Winnipeg in 1919, the position was no easy one, but under his firm, wise and tactful administration criticism was reduced to a minimum. In 1921 he resigned to contest Centre Winnipeg in the Dominion elections, but after his defeat he was re-appointed to his former position, which he held until 1928, when he resigned to resume his private practice.

He was a Lecturer in Surgery in the Faculty of Medicine, University of Manitoba, Surgeon to the Out-Patient Department, Winnipeg General Hospital, and a Fellow of the American College of Surgeons.

Possessed of a genial disposition he was popular alike with his army comrades, his professional colleagues, the old-timers of the Red River settlement, and his patients. He is survived by his widow, two sons and a daughter.

ROSS MITCHELL

Dr. Rupert E. McKibbin, died suddenly in Seattle, Wash., on November 25, 1931.

Doctor McKibbin was a graduate of the University of Toronto in 1897, and was a son of the late George McKibbin and a brother of the late Dr. L. G. McKibbin who practised for many years at Blackstock, Ont., and later in Toronto. Dr. R. E. McKibbin left for the United States soon after his graduation and practised there continuously until his decease.

Dr. James Franklin McLay, of Hamilton, Ont., was found dead on January 1, 1932, in his garage. Doctor McLay was in his automobile, and it is believed he suffered a stroke or a heart attack after driving into the garage, and succumbed.

Doctor McLay served overseas as Captain in the Medical Corps during the Great War, and was awarded the Military Cross and Croix de Guerre. He practised in Grimsby again after the war, and took an active part in public life, having been a member of the Board of Education and the Council of Grimsby, as well as serving as a Coroner, and Medical Health Officer of Grimsby and North Grimsby. He came to Hamilton two years ago to practise. Doctor McLay was a son of the late Doctor McLay of Woodstock, and was 47 years of age. He graduated from the University of Toronto (M.B., 1913).

Dr. Thomas Judson McPhee, of Nanaimo, passed away on December 20, 1931, as a result of a fall on December 17th. The late Doctor McPhee was born at Comox, Vancouver Island, fifty-one years ago, his parents being pioneers of this district. His early education was obtained at his home, and later he studied at Columbian College, New Westminster. Selecting the medical profession, he studied at McGill, where he graduated in 1906. Doctor McPhee at first practised in the north, in the vicinity of the Skeena River. In 1911 he came to Nanaimo, where he enjoyed, for twenty years, the respect and love of the community.

Doctor McPhee is survived by his widow, a son and a daughter, and by his father. C. H. BASTIN

Dr. W. W. Pirt, of Winnipeg, died suddenly of angina pectoris on December 17, 1931. He was born at Morden, Manitoba, in 1880, and graduated in medicine from Manitoba Medical College in 1909. He practised first at Griswold and later at Carman. In 1915 he went overseas to join the R.A.M.C., and after twelve months transferred to the C.A.M.C. in France. Later, he was officer in charge of a military hospital at Ramsgate.

On his return to Winnipeg Doctor Pirt was appointed medical superintendent of Tuxedo Military Hospital. In 1918 he relinquished this duty and was appointed medical examiner to the local board of pensions commissioners, which position he held up to the time of his death.

Of imposing physique and soldierly bearing, Doctor Pirt was a notable figure. He had a large practice and had the gift of making many friends.

ROSS MITCHELL

Dr. Frederick A. Rosebrugh, died at his home, Grimsby, Ont., on November 25, 1931, after a brief illness from pneumonia. The late Dr. Rosebrugh formerly was a well-known Hamilton practitioner. He was a son of the late Dr. John Rosebrugh, also of Hamilton, and was born at the old family homestead, Hamilton, on February 16, 1868. He received his early education in Hamilton and later graduated in medicine from the University of Toronto (M.B., 1892) and Victoria University (M.D., C.M., 1892). For thirty-two years he practised in Hamilton, but retired three years ago and took up residence in Grimsby. Surviving are his widow, formerly Miss Mary Palmer, only daughter of the late E. J. Palmer, of Grimsby; a daughter, Camilla, at home, and one sister, Mrs. T. Jones, of Brantford. A son, Norman, predeceased him some years ago.

Dr. Gordon Hall Rutherford, of Chatham, Ont., died in his office on January 4, 1932, from a heart attack. Doctor Rutherford, who was 31 years of age, was a son of Mr. and Mrs. James Rutherford, of Blenheim. He was educated in the Blenheim schools and

the Woodstock Baptist College, and graduated from the University of Toronto in 1927. After a two-year post-graduate course at St. Francis Hospital in New York he established a practice here two years ago, which was growing steadily. At the age of 16, Doctor Rutherford enlisted, and saw service in France. He was Medical Officer of the Kent Regiment. He took a deep interest in sports. Besides his widow and his 15-months-old son, Jack, he is survived by his parents; one sister, Miss Jessie Rutherford, at home; and four brothers, James, of Moncton, N.B., Dr. W. D., of Sarnia, and John and Glen, of Blenheim.

Dr. Francis Wood Shaw passed away at his home in Vancouver, B.C., on January 3, 1932, at the age of 77. The late Doctor Shaw was born at Galt, Ont., in 1854. He received his medical degree at Toronto in 1878, and proceeded to Carberry, Man., where for 28 years he was a busy and popular general practitioner. In 1906 he retired, and came to Vancouver to live. He is survived by a daughter, Mrs. A. M. Townsend; a son Frank, of Vancouver, and by two brothers, James and Adam, both of Carberry.

Dr. Samuel James Staples, a graduate of the University of Toronto (1905), died recently at Medicine Hat, Alta. He practised in Ontario and Manitoba for twenty years, then came to Alberta and settled at Bow Island, where he remained in active work. He leaves a wife and family at Woodville, Ont.

Dr. Walter Proudfoot Thomson, a medical practitioner in Toronto for about thirty-five years, died in the Toronto General Hospital on January 10, 1932, after a brief illness. The late Doctor Thomson was born in Toronto in 1868. He was educated at Upper Canada College and Galt Collegiate, and graduated from Victoria University (M.D., C.M., 1892). He is survived by his widow and one son, Bruce Thomson, of Toronto. In religion he was a Presbyterian. He was a member of the Masonic Order and the Oddfellows.

Dr. Walter Tisdale, of Simcoe, Ont., died at his home on December 23, 1931, in his 77th year. He was a life-long resident of Norfolk County, and practised as a medical doctor for many years at Lynedoch before succeeding the late Dr. Fred. Snider as sheriff of Norfolk County in 1918. Doctor Tisdale was a graduate of Trinity University (M.B., 1877) and of the University of Toronto (M.B., 1877). He is survived by his widow; one daughter, Amy, at home; one son, Dr. Robert W. Tisdale, Delhi; and two grandsons.

WHAT IS A 10 STONE MAN MADE OF?—What is a man made of? Dr. T. E. Lawson has answered this question. The body of a 10 stone man contains. Enough water to fill a ten-gallon barrel; enough fat for seven bars of soap; carbon for 9,000 lead pencils; phosphorus to make 2,200 match heads; magnesium for one dose of salts; iron to make one medium-sized nail; sufficient lime to whitewash a chicken coop; and sulphur enough to rid one dog of fleas! The whole, at present prices, could be bought for 5s. It is much the same whether the body is that of a village idiot or of an Einstein.

News Items

Great Britain

Lady Bruce.—We regret to record the death of Mary Elizabeth, Lady Bruce, the wife of Sir David Bruce, which occurred at Artillery Mansions, Westminster, on November 23, 1931. Lady Bruce was the daughter of the late Dr. J. S. Steele, of Reigate, was born in 1849, and married in 1883 to Sir David Bruce, who had recently obtained a commission in the R.A.M.C. From the beginning of her husband's distinguished scientific career she was his devoted helpmate. She assisted in the successful discovery of the cause of Malta fever which marked the beginning of Bruce's classic contributions to pathology, and later, in Zululand, she shared in the adventurous researches in South Africa which will associate the name of Bruce for ever with sleeping sickness. Many of the illustrations that accompanied Sir David Bruce's work were due to her skill with pencil and camera, and her husband was always both scrupulous and proud in the acknowledgments which he made of her invaluable aid. Lady Bruce received the Royal Red Cross for her nursing services in the South African War, and the O.B.E. for her cooperation with Sir David in much of his laboratory work during the Great War.

The London School of Hygiene and Tropical Medicine.—The Seventh Annual Report on the work of this School was presented at a meeting of the Court of Governors on December 4th, which was held in the Lecture Theatre on the School premises in Gower Street. Sir Holburt Waring was in the Chair. The Chairman of the Board of Management, Sir Harry Goschen, presented the report.

Sir Harry Goschen said that the School had completed two years' occupation of the new building which was opened by the Prince of Wales in July, 1929, and the Board claimed that the foundations of the courses of study and of the various research activities of the School had been laid on a sound, durable basis. The Dean and the School Council were to be congratulated on the year's results as shown by the examinations, particularly in the case of the new University Diplomas of Bacteriology and Public Health, and also upon the important developments in the course of study in Tropical Medicine and Hygiene. The Board found satisfaction in having placed Clinical Tropical Medicine on a broader and better defined basis, in association with the Hospital for Tropical Diseases. In Tropical Hygiene it was hoped to secure the services of someone who could speak with authority and experience akin to that of Andrew Balfour, if that were possible.

The School had become a School of the University of London and also had wide imperial and international obligations. In carrying out the program of teaching and research to which the School had set its hand it was comforting to learn that the Exchequer Grant, paid through the University, of £40,000 a year appeared to be reasonably safe for some time, notwithstanding the present financial emergency in the country. The School's financial position was not, however, free from anxiety, and the whole question was fully reviewed in the Report in the hope that there were friends of the School, even in these hard times, with funds at their disposal, who would come to the School's assistance.

Royal College of Physicians of Edinburgh.—The Annual Meeting of the Royal College of Physicians of Edinburgh was held on Thursday, December 3rd. Dr. Robert Thin was elected *President*. The following were elected to form the Council for the ensuing year:—Sir Norman Walker, Dr. Robert A. Fleming, Dr. Wm. Fordyce, Dr. Edwin Bramwell, Dr. Edwin Matthew and

Dr. A. Fergus Hewat. Sir Norman Walker was nominated *Vice-President*.

At an Extraordinary Meeting, held after the College Meeting, Dr. G. Lovell Gulland, C.M.G., and Dr. Wm. Fordyce were elected Representatives of the College on the Board of Management of the Royal Infirmary for the ensuing year. John Wheeler Dowden, President of the Royal College of Surgeons of Edinburgh, was elected an Honorary Fellow of the College.

The General Medical Council.—Sir Norman Walker, President of the Royal College of Physicians of Edinburgh, has been chosen President of the General Medical Council, following the resignation of Sir Donald McAlister, because of ill-health.

Alberta

Dr. J. J. Wall, of Ottawa, has been sent by the Department of Indian Affairs to make a determined effort to stamp out trachoma among the Indians in the western provinces. During the time that has elapsed since Dr. Wall made his survey last year little progress has been made in combating this disease, due in great measure to the negligence of the adult Indians who will not follow medical advice, also to the difficulty in keeping track of them. His present efforts will be directed largely to the schools. It is his intention to instruct the Indian agents, the Indians themselves, as well as the medical attendants, in the diagnosis and treatment of this disease. He will give a thorough training in this work to the attendants in the residence schools.

At a hospital conference held in Edmonton recently, attended by representatives of the Urban and Rural Municipalities Association, the Alberta Hospital Association, the Municipal Districts Hospital Association and the Association of Municipal Districts, approval was given in principle to a far-reaching scheme under which municipalities in this province would make grants to hospitals on the basis of hospital days of residents from an outside district. Dr. M. R. Bow, Deputy Minister of Health of Alberta, presided.

According to Dr. Duncan Gow, Medical Health Officer of Calgary, there has not been a single case of small-pox in this city during the past two and a half years. This excellent record is probably due to the continued efforts which have been made by the local health authorities to have vaccination against this disease carried out. At the present time the local health department is giving considerable attention to the inoculation against diphtheria, which disease has been present among a greater number than for some time past.

At a meeting of the Central Alberta Medical Association, the question of remuneration for professional services rendered to indigents was discussed, as well as various phases relative to the practice of medicine. The members unanimously agreed that for the benefit of the public no better system than the present one could be adopted, since the patient has the right to call the physician of his choice, and the physician has to keep abreast of the times else he would not be consulted.

The Council of the College of Physicians and Surgeons of Alberta sent out a questionnaire asking physicians whether they would suggest any change in the practice of medicine, having in mind the requirements of the public and a fair remuneration for the services rendered. Up to the present time very few replies have been received. Some of the local medical societies have suggested that the Council prepare a scheme and present it to the members for consideration.

In the recent elections held by the Council of the College of Physicians and Surgeons, Dr. R. Parsons, of Red Deer, and Dr. W. A. Wilson, of Edmonton, were re-elected by acclamation to their former offices.

The Council of the College of Physicians and Surgeons of Alberta has placed before the executive committee of the Municipal Districts suggestions as regards Act amendments, in the hope that the present misunderstandings as to what constitutes an indigent may be classified. At present some municipal districts take no regular steps to care for indigents when ill. If one of the suggestions were placed on the statute books, each secretary of a district would be empowered to issue orders, provided the local municipal district have not appointed others. The Council has further suggested that if the Municipal Districts Association can define exactly what the term "indigent" implies, then the medical profession would consent to fees for indigents at rates approximating those paid by the Workmen's Compensation Board. It has further been suggested that provision be made in the Compensation Act, the same as in the Hospitals Act, whereby the Minister of Health has power to settle all matters in dispute, determining who is indigent and where his place of abode is.

The attention of the Department of Health at Ottawa has been called to the flood of brochures and pamphlets on drugs of questionable value coming from the United States and fairly inundating the medical profession. Few if any of these highly vaunted drugs have passed the searching tests of the department of pharmacology of the American Medical Association. During the past few months the amount of advertising material on these drugs of doubtful value has greatly increased, so that the time consumed in sorting mail of this description and casting it into the waste basket has increased until it has become burdensome and a decided nuisance.

The Municipal Hospital at Coronation has decided to remain open, though for some time, owing to financial conditions, it was doubtful whether it would be able to do so. This institution was opened in 1915 and since then over 80 per cent of the patients have been from rural districts. So much is owing by these patients that payment of their dues would relieve the hospital board of any financial worries. The municipality claimed that they were obliged to pay for bona fide indigents only. A change in arrangements has been made since the visit of a representative from the Provincial Department of Health. The new program was submitted to the town council and was approved. The new regulations provide that rural patients, excepting the special emergency cases, may only be admitted to the hospital by providing a cash payment to cover the estimated amount of the hospital bill, or by an order signed by a councillor or by the secretary-treasurer of the municipal district in which they reside, to be presented upon entry. It is felt that by demanding payment in this way, and making a reduction in staff salaries the institution will not be an additional burden on the taxpayers of the town.

Rather heated discussions have taken place in Calgary regarding the recommendations of Dr. D. Gow, the Medical Officer of Health, asking for the pasteurization of all milk sold in this city. He estimates that fully 15 per cent of the milk sold here is in a raw state and that such milk is a source of danger to the public. Under the present system the city could not refuse to grant a license to any dealer provided that he complied with the sanitary regulations in regard to equipment for the handling of milk. Dr. Gow further requested authority from the City Council to refuse any further permits for the sale of raw milk, and that he be given authority to refuse permits for transfers of exist-

ing raw milk licenses, should the present holders of these decide to discontinue their business. He stated—"Montreal has had a compulsory pasteurization by-law since the year 1927, subsequent to the typhoid epidemic, and at the present time more than 95 per cent of the milk supply of Montreal is pasteurized. The remaining 5 per cent is either certified or of a special grade. There are five cities in Canada at the present time with 100 per cent pasteurization and there are eleven others with over 95 per cent, the remaining 5 per cent or less being either certified or of a special grade. With these facts in view the necessity of a compulsory pasteurization by-law for Calgary is apparent and I would respectfully urge you to give the matter serious consideration. We would not wish to go through the same experience as the city of Montreal in 1927. As conditions are at present the possibility of a milk borne epidemic is ever with us and those in authority must bear the responsibility".

Many arguments for and against compulsory pasteurization were brought forward at a special meeting of the City Council when it was decided to leave the question in abeyance for some time.

G. E. LEARMONTH

British Columbia

Interest in medical circles in British Columbia has centred around the sittings of the Royal Commission which is investigating drugless healing and allied quackeries. Several sessions were held during December, and hearings were to be resumed on January 6th. Argument as to what is meant in the Medical Act by "three years' study", elicited the opinion on behalf of the chiropractors that three consecutive terms of six months could be so interpreted, as distinguished from three calendar years. The acerbity which has been a feature of the proceedings was augmented when counsel for the drugless healers asked a medical witness if he did not know cases where surgeons removed the vermiform appendix simply because the patient had the price. A high light was provided by the announcement of the counsel for the chiropractors that a demonstration of an adjustment would be carried out for the benefit of the Commissioner. In tacitly agreeing, the Commissioner made it plain that he himself would not be the patient! What was proving a somewhat tedious discussion of a sanipractor's qualifications was suddenly enlivened by the words, "You lie," when the examining lawyer suggested to the sanipractor that he had produced a photostatic copy of a diploma because he was unable to produce the original.

The Commissioner announced that, if necessary, he was prepared to hold sittings throughout the province. This was brought out when a witness for the irregulars had declared that his branch of the healing art was practised generally through the province, and that it was not possible for his confrères to appear in person.

In connection with the foregoing, it is stated that a mass meeting was held in a Vancouver theatre, at which, amongst others, a suspended medical man, member of the Provincial Legislature, a member of the Dominion House, and various quacks spoke. The fight for medical liberty was compared with the struggles for religious freedom of former times. The audience was told that as free citizens they should have the right to say who should treat them. Biological laboratories were stated to be money-making machines; vaccines and serums naturally did not escape mention; and the "medical monopoly" was thoroughly pilloried.

The activities of the Canadian Medical Indemnity and Health Insurance Company are receiving the attention of the British Columbia Medical Association. This company has recently circularized the profession, enclosing schedules of payment for services, and inviting

offers to undertake work under their insurance scheme. The rates are in general similar to those paid by the Workmen's Compensation Board. The company had shown a disposition to deal with the provincial association, and the question had been referred to a committee to investigate. Not a little mystery seems to surround the organization, and this latest move would seem to indicate that they intend to proceed with or without the approval of the British Columbia Medical Association. In the meantime members of the profession have been advised to have nothing to do with the scheme.

Figures published by the Provincial Board of Health bearing on maternal mortality compare very favourably with Canada as a whole. In 1921 the rate of maternal deaths per 1,000 living births was 4.8, as compared with 5.1 for the Dominion. 1924 was the high year, in the ten year period up to 1930, having a rate of 6.8, while the figures for Canada were 6.0. In 1930 the rate was 5.8, a rate which is 0.1 below that for the Dominion. The rate of maternal deaths per 100,000 of population has varied from 10 in 1921 to 12 in the three succeeding years, dropping again to 11, and, with slight variations, continuing the same to 1930. C. H. BASTIN

Manitoba

In the last session of the Legislature Mr. Pratt, M.L.A. for Birtle, introduced a resolution asking for an enquiry into medical services. It is stated that, particularly in rural districts, many people had found it almost impossible to procure medical services at reasonable rates. A committee of the Legislature has been holding sessions and has heard evidence from various bodies, medical and otherwise.

On the retirement of Drs. H. P. H. Galloway, O. Bjornson and Hugh Mackay from the honorary attending staff of the Winnipeg General Hospital a presentation was made to each of them at the annual meeting of the staff on January 14th. ROSS MITCHELL

New Brunswick

On December 8th, in the early morning, fire was discovered in one of three cottages used to house convalescent tuberculosis patients at the Jordan Memorial Sanatorium, River Glade, N.B. The flames rapidly spread to the building which housed the nurses' home, dining hall and kitchen. The fire looked so serious at one time that the main building was emptied of its one hundred and twenty patients. This building was afire for a short time, but was ultimately saved without severe damage. The fire loss is estimated at \$100,000.00.

Dr. P. M. Knox, Superintendent of the Sanatorium, deserves a tremendous amount of credit for the efficient manner in which he handled a most serious situation. No patients were injured and the comfort of the patients and staff was most excellently looked after following the severe damage to the plant.

Immediately on receipt of the news of the fire, Dr. R. J. Collins, Dr. A. M. Clarke, of the Saint John Tuberculosis Hospital, left by motor for River Glade and aided in the emergency caused by the fire. It was said that there is no thought of immediate construction. The burnt buildings will probably be replaced next summer.

Dr. George G. Melvin, Chief Medical Officer for New Brunswick, has resigned his position which he has held since 1918. His appointment was made when Dr. W. F. Roberts was Minister of Health. Dr. Melvin assisted in the preparation of the present New Brunswick Health Act, and under his immediate supervision

the present highly satisfactory method of gathering vital statistics was initiated.

The local government has appointed Dr. Wm. Warwick, of Saint John, to succeed Dr. Melvin. His appointment dates from January 1, 1932. Dr. Warwick has been identified with public health work for twenty years. He is a graduate of McGill University (1904). In 1911, he was appointed to the Federal Government Quarantine Service as Bacteriologist. In 1913, he received his public health diploma from McGill University. He served overseas in the 115th battalion and later with the 5th Canadian Mobile Laboratory. On his return to Canada, he took up his work with the Federal Government. In January, 1920, he joined the Department of Public Health in New Brunswick as District Medical Officer for the southern district.

Dr. Chas. W. MacMillan, for the last four years Travelling Tuberculosis Diagnostician in the western division of New Brunswick, has been appointed medical officer in the southern district of New Brunswick to replace Dr. Warwick. Dr. MacMillan graduated from Dalhousie in 1924.

Dr. S. R. D. Hewitt has assumed his duties as Superintendent of the Saint John General Hospital. His appointment dates from January 1, 1932.

Dr. A. F. Emery, one of the oldest practising physicians in New Brunswick, has been confined to the Saint John General Hospital for some time by severe illness caused by over-work. Dr. Emery has almost completed fifty years of practice in Saint John. The improvement in his health is now satisfactory.

Probably due to general depression and hard times, there has been some agitation among the various municipal bodies to the effect that the municipality should be relieved of payment for the hospitalization of their tuberculosis patients. Perhaps the payment for these patients becomes rather arduous, but there seems no reason why this burden should be shifted to the Provincial Treasurer's Department. After all, open cases of tuberculosis are a menace in the community and an institution is the only satisfactory place for their treatment, and it seems only fair that each municipality should pay for its destitute sick.

The number of tuberculosis patients requiring hospitalization seems to be on the increase. The added facilities at the Saint John County Hospital are fully occupied. The Sanatorium at River Glade has rarely an empty bed, and for this reason the new Sanatorium on the North Shore is extremely welcome. It is understood that the building program at Bathurst is progressing satisfactorily. A. STANLEY KIRKLAND

Nova Scotia

The Halifax Medical Society held two meetings during the past month, one on December 2nd and the other on December 16th. At the first meeting, Dr. M. J. Carney delivered an address entitled "Pædiatric pot-pourri." The second meeting was held at the Children's Hospital where several interesting cases were shown. Dr. Carney presented a case of coeliac disease; Dr. T. B. Acker presented three cases, one of double congenital dislocation of the hip, another of Volkmann's ischæmic paralysis, and a third of multiple involvement of epiphyses, but offered no diagnosis in the last. Dr. P. Weatherbe showed a case of burns treated by tannic acid method, and a case of streptococcic acute osteomyelitis of the humerus.

The death of Dr. W. H. Hattie has removed a well-known and popular figure from Nova Scotian medical

circles. He carried on a great many activities in spite of ill health. He held the post of Professor of Public Health, and Assistant Dean of the Medical Faculty, Dalhousie University. His genial personality will be greatly missed by both colleagues and students.

Dr. Judson V. Graham of Halifax, returned home during December from London, England. While abroad he attended a post-graduate course at the London Hospital.

N. B. DREYER

Ontario

The Salvation Army of Toronto has erected a Memorial Tablet in the concourse of the Army Training College on Davisville Avenue, as an expression of esteem and appreciation of the service rendered by the late Dr. Richard Conboy, who, for some years, treated the Cadets-in-Training free of charge.

Announcement has been made that the new Misericordia Hospital at Haileybury is to be converted into a sanatorium for the treatment of tuberculous patients from the districts from North Bay to Nakina and north as far as James Bay. The hospital will provide for 100.

Plans are under way for the construction of a \$40,000 addition to the Oshawa General Hospital.

Dr. T. Crossan Clark has been appointed by the Hospital Board of the Hamilton General Hospital to fill the vacancy on the Advisory Committee of the Hospital created by the death of Dr. F. B. Mowbray.

It is proposed to make an expenditure of \$100,000 on an addition to the Freeport Sanatorium for the treatment of tuberculosis. The Dominion and Provincial Governments will pay 35 per cent of this cost, the balance to be carried by Galt, Kitchener and the County of Waterloo.

New buildings, with three hundred beds, have been added to the Ontario Hospital for Epileptics at Woodstock.

J. H. ELLIOTT

Prince Edward Island

The Falconwood Hospital for the Insane, three miles outside of Charlottetown was entirely destroyed by fire on December 15, 1931. The fire started in the upper section of the west wing. Firemen on arrival found that part of the building a mass of flames. The water supply was totally inadequate; available pressure would not throw a stream to the blazing upper sections of the men's ward in the west wing. Quickly the main building caught. Dynamite was used in an effort to blast away connection with the east wing, but the supply proved unequal to the task.

About three hundred patients who were in the building made good their escape, but two men were killed; one was burned and one fell to the ground from the top of a ladder. The loss is about \$400,000.

Quebec

The handling of outbreaks of infantile paralysis has become a matter of great concern in most large cities, and inasmuch as the serum of convalescents from the disease, as well as that of a certain proportion of persons who have not had the disease, has proved of much service in prevention and, when used early, in the cure of the disease and the limitation of paralysis, endeavours are made to keep on hand a sufficient

quantity of such serum for emergencies. Montreal has been interested in this movement for more than two years.

In March, 1929, a Poliomyelitis Committee was formed to make available a supply of serum for the needs of the city. Action was taken at that time because it appeared likely that the disease, which had been moving eastward in epidemic form during the previous years, might be expected to become prevalent in Montreal. This action was approved by the Medico-Chirurgical Society at a meeting held on April 5, 1929. Information was secured from those places where there had been recent outbreaks as to their experience for the guidance of the Committee.

In order to inform the public as to what infantile paralysis is and why convalescent serum is used, a series of articles, in the form of interviews, was prepared, and these articles were published in the *Montreal Star*. The *Montreal Star* opened a subscription list for the collection of the money required. The response was immediate, and sufficient funds were soon collected.

The Children's Memorial Hospital gave every assistance in facilitating the work by allocating the required space for the collection of the serum, and also by allowing their resident pathologist, Dr. P. N. MacDermot, to devote time to the collection, preparation, testing and distribution of the serum.

The collection of serum was begun in August, 1929. The committee is particularly indebted to one of its members, Dr. L. J. Rhea, for what he did in organizing the collection and supervising the work. The collection of blood was discontinued at the end of September, 1929, by which time there was on hand a supply sufficient to treat 100 cases, which the Committee deemed to be a reasonable reserve. During 1929, serum was provided for the treatment of 28 cases in Montreal. Some serum was sent out of town.

In the spring of 1930, the committee met and considered the situation. It was decided that the reserve supply was sufficient and that no further collection need be made unless there was evidence of an outbreak. During 1930, only 10 cases were reported, so the Committee was inactive that year.

In August, 1931, when an unduly large number of cases began to appear, the committee immediately approached the Director of the Montreal Department of Health, and placed its resources at his disposal. The Director asked the committee to proceed to collect a supply of serum, as it appeared that the reserve stock would be shortly exhausted. Through the newspapers, an appeal was made for donors and the Children's Memorial Hospital was again placed at the disposal of the committee for use as a collecting centre. Every effort was made to meet the increasing demand for serum as the number of cases increased. The whole work was carried on in closest cooperation with the City Department of Health. When it became apparent that the funds of the committee would be inadequate, the Health Department agreed to pay the committee the cost of the serum supplied to the department after September 28th. Up to that date, the city had received 169 vials or doses of serum free.

The potency of the serum was checked by Dr. Maurice Brodie of the Department of Bacteriology at McGill University. Doctor Brodie, at the request of the committee, also tested the blood of a group of adults who had not had the disease, in order to determine which had antibodies in their blood, and also, made an estimation of the potency of their serum as compared with the serum of convalescents, the idea being that adults with a high potency would be a better source for serum in quantity, and be more readily available than the convalescents.

The Montreal Department of Health has now taken over the responsibility of collecting serum for the use of the city in the future.

Saskatchewan

Dr. S. R. D. Hewitt was the guest of honour at a luncheon given by the medical staff and the Board of Governors of the Regina General Hospital on December 29th, at the Hotel Saskatchewan. He was presented with a silver tray as a souvenir of his stay in Regina, where he has been superintendent of the General Hospital for two and a half years. He left on the last day of the year for St. John, N.B., where he is to be superintendent of the hospital there.

The Cancer Commission has opened two clinics, one in the General Hospital, Regina, and one in the City Hospital, Saskatoon. Only those patients who are referred by their attending physician as suspected cases of cancer will be admitted to the services of the clinics. A fee of ten dollars will be charged for each first consultation, payable at the time of admission to the clinic. This fee does not provide for any hospital care. Fees will be charged for treatment by radiotherapy under the Commission's service, but fees for surgical services must be arranged with the surgeon concerned. If the patient is unable to pay, the municipality in which the patient resides must assume the responsibility for treatment.

The new nurses' home at St. Paul's Hospital in Saskatoon was formally opened by His Honour the Lieutenant-Governor of Saskatchewan. Built to accommodate 150 nurses, the new home is able to supply the present needs of the hospital and increasing demands for a number of years. Each student in training will enjoy the privacy of a single room, while spacious reception rooms have been provided for recreational purposes. His Honour remarked that the erection of such a building to house the School of Nursing was an indication of the progress which had always characterized the Sisters of Charity. It was also an indication of their faith in their work and of their efficiency. His Lordship Bishop Prud'homme stressed the courage of the sisters who did not hesitate in a year of depression to burden themselves with the debt which the building of such an edifice entailed. Humanity needed charity more than ever to-day and the Grey Nuns were splendidly aware of this.

LILLIAN A. CHASE

United States

The American Association for the Study of Goitre again offers an award of three hundred dollars (\$300.00) for the best essay based upon original research work on any phase of goitre presented at their annual meeting in Hamilton, Ontario, Canada, June 14, 15 and 16, 1932. It is hoped this offer will stimulate valuable research work, especially in regard to the basic cause of goitre.

Competing manuscripts must be in English and in the hands of the Corresponding Secretary, J. R. Yung, M.D., Rose Dispensary Bldg., Terre Haute, Ind., and later than March 15, 1932. Manuscripts arriving after this date will be held for the next year or returned at the author's request.

The first award of the 1931 Kansas City, Mo., meeting was given to Dr. Bruce Webster, Presbyterian Hospital, New York City, for his essay entitled "Studies in the etiology and nature of simple goitre as produced experimentally in rabbits."

Public Health Education in Cleveland.—The Academy of Medicine of Cleveland, in an endeavour to make a contribution to the health of the community, has been presenting to the public three lectures on matters of interest. These lectures are given on certain Sunday afternoons in December, January and March. The topics chosen are "What science knows about

cancer", "Why think about eating?", and "Fighting death after forty", and are being dealt with by well known professors of Western Reserve University. This scheme was first tried a year ago and proved so successful that it was decided to continue on the same lines as an annual feature.

General

Dr. J. Oscar Thomson, a medical graduate of McGill University, has been appointed superintendent of the Canton Hospital, China's most important medical institution and training school.

He is the son of the late Rev. J. C. Thomson, M.D., who for many years worked as a missionary among the Chinese of Montreal. At one time Dr. Thomson was superintendent of the Jeffrey Hale Hospital, Quebec, and while there married the daughter of G. B. Ramsay, of the Cunard Steamship Company.

Dr. Thomson was born in the Portuguese colony of Macao on the China coast, while his parents were in the Orient on missionary work.

The Royal Canadian Army Medical Corps.—Major J. A. Murray, R.C.A.M.C., qualified in (h) (v)—Majors R.C.A.M.C. for promotion to Lieutenant-Colonel at an examination held at Vancouver, B.C., from 16th to 18th November, 1931. (H.Q. 245-5-8)

Postings for duty are as follows.—

Lieutenant-Colonel R. C. Coatsworth, M.C., to command No. 2 Field Ambulance, with effect from the 26th June, 1931. (H.Q. 372-1-67)

Lieutenant-Colonel R. H. McGibbon, to command No. 9 Field Ambulance, with effect from the 24th August, 1931. (H.Q. 372-7-2)

Lieutenant S. G. U. Shier, to No. 1 Detachment, London, Ont., on appointment. (H.Q. 857-8-19-222)

Lieutenant D. S. Bruce, to No. 4 Detachment, Montreal, P.Q., on appointment. (H.Q. 857-8-2-165)

Lieutenant M. M. Ross, to No. 6 Field Ambulance, with effect from the 19th October, 1931. (H.Q. 353-6-3)

Lieutenant H. G. Pretty, to No. 6 Field Ambulance, with effect from the 20th October, 1931. (H.Q. 353-6-2)

Lieutenant A. M. Clarke, to No. 14 Field Ambulance, with effect from the 20th July, 1931. (H.Q. 353-14-4)

Lieutenant S. E. Grimes, to No. 23 Field Ambulance, with effect from the 1st September, 1931. (H.Q. 353-24-2)

Book Reviews

Female Sex Hormonology. William P. Graves, A.B., M.D., F.A.C.S., Professor of Gynecology, Harvard Medical School. 131 pages, illustrated. Price, \$4.00. W. B. Saunders: London and Philadelphia; McAnish & Co., Toronto, 1931.

Undoubtedly there is much need at present for a clear presentation of the chief results of recent experimental work on endocrinology and reproduction, with some consideration of their probable bearing on gynecological problems, but this slim little volume does not lessen the need. The author has no gift for exposition. He devotes three enthusiastic pages and a diagram, for instance, to Hartman's views on menstruation, pages, however, which would certainly leave the uninstructed reader in the dark, both as to the nature of Hartman's views and the arguments in favour of them. A more serious criticism is that the author is not wholly reliable. He fails to make any distinction between oestrus and breeding season, and regards puberty and maturity as synonyms. He makes the curious statement that "cestrin

was now recognized as essentially a *growth* hormone . . . progestin appeared to be antagonistic in its action to oestrin", though in the rat or mouse uterus oestrin causes mere distension and progestin causes true growth. To suggest that the ovarian hormone is an activator of the anterior lobe of the pituitary is to fly in the face of all direct evidence, but apparently activation of a gland is confused with synergism between two hormones. Examples of this incomplete grasp of the subject could be multiplied. There are many misprints, especially in the spelling of proper names of foreign workers.

The Clinical Interpretation of Aids to Diagnosis. Vol. II. By various authors. 342 pages, illustrated. Price 10/6 net. Published by The Lancet, Ltd., London, 1931.

This is a second volume published by *The Lancet* under the above title, the first having appeared about a year ago. It is an attempt to bring the laboratory closer to the general practitioner, to enable him to use the pathologist, the biochemist, and the radiologist in his own and the patient's best interests, and further to enable him to evaluate properly the information which he derives from them. The various articles included in this second volume, as in its predecessor, are from the pens of men who are not only acknowledged masters in their own field but who have some idea of the difficulties and needs of the general practitioner. The book can be recommended to any student of medicine, whether he be undergraduate, general practitioner or consultant.

The Rheumatic Infection in Childhood. Leonard Findlay, M.D., D.Sc., M.R.C.P., Visiting Physician, East London Hospital for Children, Shadwell, etc. 187 pages, illustrated. Price 10/6 net. Edward Arnold & Co., London, 1931.

Doctor Findlay's study is based almost entirely on his own personal experience from 1914 to 1930, during which time 701 examples of the rheumatic infection passed through the wards of his hospital in Glasgow. Of these Doctor Findlay has been successful in learning the fate, up to the present moment, of all but 8. Some of the patients were under observation for as long as fifteen years, and the majority longer than five years. The subject is considered under various headings, which makes it very easy to look up any aspect which is of particular interest to the reader. The chapter on Treatment is of decided value. It particularly emphasizes the need of giving sufficient dosage of the salicylates and the necessity of continuing the treatment along with proper rest over a period of many weeks. This book can be recommended without hesitation to every physician.

Illustrated Primer on Fractures. Cooperative Committee on Fractures of the American Medical Association. Second edition. 64 pages. Price, \$1.00. American Medical Association Press, 535 North Dearborn St., Chicago, 1931.

This most useful work is the outcome of certain demonstrations on the treatment of fractures which were arranged by a Cooperative Committee on Fractures chosen from the Sections of General and Abdominal Surgery and of Orthopaedic Surgery of the American Medical Association, and is designed to aid the practising physician in the handling of this important group of cases. For four years these demonstrations, which formed part of the annual Scientific Exhibit, were the centre of large and eager audiences. Each year an illustrated folder, prepared in advance, depicting the booths and reproducing the legends which carried the important messages, was distributed to those interested. The demand for this folder was so great that it was deemed advisable to assemble the information under one cover. This policy evidently met a "long-felt want", for in the short space of nine months a second edition was required, and in four months more, a second printing.

The present edition (second and second printing) is greatly improved by attention to the illustrations which, in rather more than half the cases, have been modified or redrawn; by the re-editing and revision of the legends;

and by the addition of four new topics—Compression Fracture of the Spine, Fracture of the Skull, Active Movements in the Treatment of Fractures, and Massage during the Treatment of Fractures; and there is an addendum specifying the various splints and accessories that it is desirable for the doctor to carry in his automobile or to keep at his office. The illustrations are line drawings of the various exhibition booths, depicting the manipulations necessary in dealing with the commoner fractures, together with informative legends. Thus, the whole procedure and the rules that should be observed can be appreciated at a glance, a very ingenious idea. The book contains blank pages for notes or comments. It was not intended that the methods of treating fractures should be standardized, but merely to indicate what are acceptable procedures. From this point of view and from the point of view of practicality the Primer will be found most useful. The investment of one dollar in its purchase will be followed by large dividends.

Brain and Spinal Cord. Emil Villiger, Professor E.O. in University of Basel. Edited by W. H. F. Addison, B.A., M.D., Professor of Normal Histology and Embryology in University of Pennsylvania. Fourth edition. 337 pages, illustrated. Price \$6.50. J. B. Lippincott, Philadelphia, London and Montreal, 1931.

The value of Professor Villiger's Manual is so well known as not to require detailed presentation. The outstanding and somewhat unique feature of the cross-section atlas of Part III makes it practically essential to one wishing to acquire a thorough grasp of the anatomy of the nervous system. The present fourth revised American edition, from the tenth German edition, is largely the same as the previous one. The revision has aimed at bringing the text into conformity with recent conceptions, and the characteristically clear figures have been added to and in some cases replaced. While, as may be necessary in such a type of manual, the value of the text is somewhat limited, yet in conjunction with the profuseness and lucidity of the illustrations the result is a valuable, if not indispensable, aid to the student of neurology.

Annals of the Pickett-Thomson Research Laboratory. Vol. 7. David Thomson, O.B.E., M.B., Ch.B., D.P.H., Hon. Director, Pickett-Thomson Research Laboratory and Robert Thomson, M.B., Ch.B., Pathologist to Pickett-Thomson Research Laboratory, St. Paul's Hospital. 441 pages, illustrated. Price \$10.00. Ballière, Tindall & Cox, London; Williams & Wilkins, Baltimore, 1931.

This volume, the seventh in the series issued from the Pickett-Thomson Laboratory, is a comprehensive and extensive study of erysipelas, skin diseases and measles, particularly as to their streptococcal relationship, although much of more general information is included. The etiology of erysipelas is discussed at some length. The authors conclude that *S. erysipelatis* is a separate and distinct organism from *S. pyogenes*, on both clinical and serological grounds. They proceed to give a very complete review of the disease as to immunity, treatment, complication, mortality, epidemiology and infectivity.

Numerous researches and investigations have been reported endeavouring to establish the etiological significance of streptococci in various skin diseases. The authors conclude that the results of these are contradictory and that a solution to many skin problems has not yet been found. The streptococcal origin of impetigo contagiosa has been established quite definitely; the relation of this disease to pemphigus neonatorum—whether the two are or are not identical—is still to be proved. Other skin lesions are discussed, and, while in many of these streptococci are assumed to be the cause in most cases they have not so far been proved to be the etiological factor. The authors point out that the literature on these subjects is inadequate and incomplete and that there is still room for a great deal of research in the field.

A streptococcal origin or factor in measles has long been suspected and has for years been the subject of much research. This material is presented and discussed,

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but the conclusion drawn is that the evidence is against a streptococcal etiology and rather favours a virus as the causative agent. The streptococcal relationship is only a small part of the material presented on measles; immunity, complications, mortality, prevention with convalescent serum, and many of the public health problems are discussed fully. Undoubtedly this is the most valuable part of the paper.

The present volume quite measures up to the excellence of the previous Pickett-Thomson publications, and will be of inestimable value as a collected and classified source of the available material on these topics.

Approved Laboratory Technic. John A. Kolmer, M.D., D.Ph., D.Sc., LL.D., Professor of Pathology and Bacteriology, and Fred Boerner, V.M.D., Associate Professor of Bacteriology, School of Medicine, University of Pennsylvania. 664 pages, illustrated. Price \$7.50. D. Appleton & Co., New York, 1931.

This book describes one or more methods for practically every examination that the laboratory in a modern hospital may ordinarily be requested to perform. Although prepared under the auspices of the American Society of Clinical Pathologists, the authors assume responsibility for the selection of the methods given. Besides the strictly clinical pathological procedures there are sections dealing with bacteriological, serological, biochemical and toxicological examinations; basal metabolic tests; laboratory equipment; the care and use of laboratory animals; and the collection of material for examination. Histological methods scarcely belong to such a book but the authors have included a section giving a minimum technique for routine laboratory practice.

For those responsible for the technical work of the laboratory this manual will be found invaluable.

A Guide to Human Parasitology for Medical Practitioners. D. B. Blacklock, M.D., D.P.H., D.T.M., Professor of Parasitology, Liverpool School of Tropical Medicine, etc., and T. Southwell, D.Sc., Ph.D., A.R.C.Sc., F.Z.S., F.R.S., Lecturer in Helminthology, School of Tropical Medicine, Liverpool, etc. 272 pages, illustrated. Price, 15/- net. H. K. Lewis & Co., London, 1931.

This is a unique book, quite unlike any other work on parasitology with which we are acquainted. In spite of this, however, and, indeed, because of it, we are convinced that it has a necessary place among the textbooks on Parasitology. The authors, whose standing guarantees the accuracy of what they have written, have had in mind the preparation not of a complete textbook but of a guide which will be of service to the practitioner, who, not being a specialist, may nevertheless be required at times to make a diagnosis in diseases caused by animal parasites; a help to those taking courses of instruction for diplomas in Tropical Medicine, Tropical Hygiene and Public Health; a help to medical officers of health and sanitary inspectors, who will wish to know what parasites are dangerous and which of them are likely to be met with in water and various food substances.

The authors have confined themselves, wisely, to setting forth the salient features relevant to spirochaetes, and the protozoan and metazoan parasites inimical to man, together with the methods of diagnosis that are simple and most easily learned. To reach their end, all extraneous matter has been pruned away. Useful information is given about the microscope and the simpler, though adequate, methods of examination, together with points in morbid anatomy. The drugs which have been found most useful in treating the various conditions, with their dosage, are mentioned, and a useful list of chemicals and apparatus required for the study of parasites is given at the end. The beauty of it all is that the manipulations dealt with are simple, not requiring the employment of elaborate and costly apparatus or a completely equipped laboratory; they are within the competence of the ordinary practitioner.

Many tables are given, which deal in a graphic way with the life history of the various parasites and their

relation to man and the lower animals, as well as some which set forth clearly the cardinal diagnostic points. There is no superfluous matter, and yet the subject of parasitology as it relates to man is adequately treated for ordinary purposes. Those who wish more complete information are referred to other works, a list of which is given.

We have nothing but praise for this book. It is accurate, clear, and thoroughly well adapted for its purpose.

Medical Electricity for Students. A. R. I. Browne, Member of Society of Radiographers, Radiographer at the Royal Alexandra Infirmary, Paisley, Scotland, etc. Third Edition. 245 pages, illustrated. Price \$4.00. Oxford University Press, London; McInish & Co., Toronto, 1931.

Following the enormous development of physical therapy in the Great War, and the consequent increase in membership of the Incorporated Society of Trained Masseuses, the scope of this body was extended and it was recognized by Royal Charter as The Chartered Society of Massage and Medical Gymnastics. The examination course now includes massage, medical gymnastics and medical electricity, with some additional specialties. As a textbook on medical electricity the fundamentals, apparatus and methods, are clearly described for the use of candidates, with supplementary information as to high frequency and diathermy treatments as well as ultra violet therapy. Some important improvements in apparatus, such as non-vacuum electrodes and almost noiseless spark-gaps, are omitted, but in other respects the volume is very complete and strictly orthodox as a guide to students preparing for examination.

Clio Medica. Anatomy. Geo. W. Corner, M.D., Professor of Anatomy in the University of Rochester. Series No. 3. 82 pages, illustrated. Price \$1.50. Paul B. Hoeber, Inc., New York, 1930.

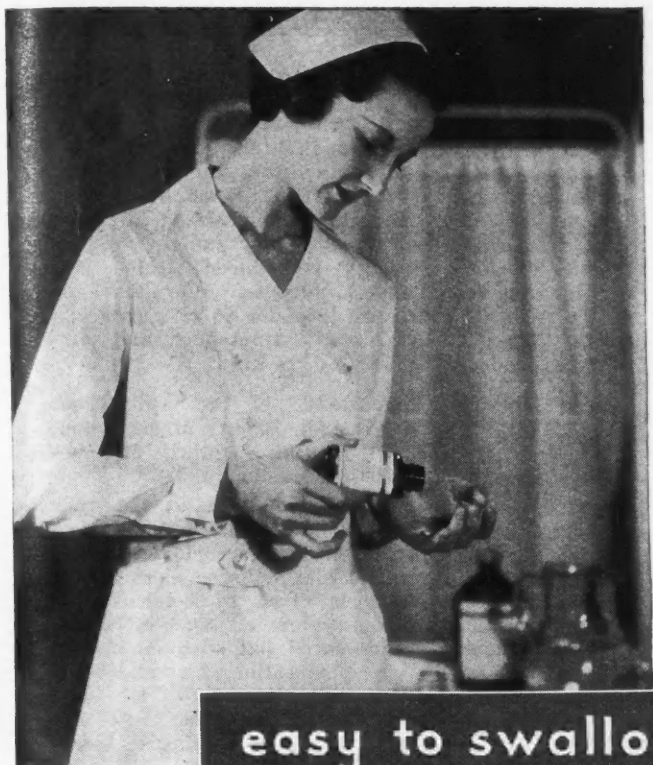
The author of this volume on the history of anatomy, one of a series of volumes, under the editorship of E. B. Krumbhaar, M.D., on the history of medicine, has shown himself to have mused devotedly at the shrine of the Goddess to whom the series is dedicated. Within the scope of 73 pages he has presented a concise, lucid and fascinating story of the recessions and progress in the development of the science of anatomy from the sixth century B.C. towards its status at the present day.

The "Story of Anatomy" is a fitting description of this small volume, as it is not any mere recital of dates and personalities, but these are linked together in such a charming style as to lead one from page to page until, all too soon, the last leaf has been turned. One might wish that more recognition had been given Leonardo da Vinci, who in that great period of the Renaissance inaugurated a revolution in descriptive anatomy and its pictorial delineation, but the evolution of anatomical drawings has been well illustrated by the author's selections.

To all who have found difficulty in disentangling the threads of the story of anatomical progress from the larger and more generalized treatises on the history of medicine, and to those who have not been thrilled with the fascination of its story, this volume can be most heartily recommended.

Osler and Other Papers. William Sydney Thayer, M.D., LL.D., Professor Emeritus of Medicine of the Johns Hopkins University. 386 pages. Price \$3.50. Johns Hopkins Press, Baltimore; Oxford University Press, London, 1931.

As a teacher and author Professor Thayer needs no introduction. As President of the American Medical Association and of the Association of American Physicians he has been an outstanding figure in medicine on this continent. The volume now published by the Johns Hopkins Press presents a selection from his papers and addresses. Practically all are of medical interest. Those biographical will prove of general interest. Early in the development of the Hopkins School Thayer became one



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of Osler's assistants and continued an intimate friend. His interest in men and books, in teaching and writing, was due to a great extent to Osler's influence, and we are thankful that the author gives us in this collection some of his addresses on Osler. In their long and close association in Baltimore Thayer saw all sides of the great physician and in his delightful addresses he gives us a charming picture of him as teacher, associate, organizer, bibliophile, historian, scholar, friend. Five of the papers and addresses are reminiscences and appreciations of Osler and his work. One of these first appeared in this *Journal*—that given on the occasion of the dedication of the Osler Library at McGill University. In this *Journal*, too, appeared the address in medicine delivered before the Canadian Medical Association at Quebec in 1919, on the one hundredth anniversary of the appearance of Laennec's great work "*Traité d'auscultation médiate*". The papers on Pasteur and Bright are most pleasing. Every physician and student who reads will welcome the volume and find much profit and enjoyment in its perusal.

Gynæcology and Urology for Nurses. Samuel S. Rosenfeld, M.D., F.A.C.S., Adjunct Obstetrician and Gynæcologist, Lebanon Hospital, New York City. 230 pages, illustrated. Price \$2.00. William Wood, New York, 1931.

This compact little volume gives an excellent review of the subjects of gynæcology and urology. Clear concise descriptions are given of the anatomy of the pelvis, the physiology of the special organs, the pathology and diseases more frequently encountered, and a brief review of the more common operations. Non-essential data are reduced to a minimum. Non-operative procedures are carefully described, special attention being paid to the set-up. The section on Urology contains much valuable information not easily available to the nurse in the usual text-books on nursing. The volume is well illustrated and set up and can be recommended to nurses.

Black's Medical Adviser for the Home. John D. Comrie, M.A., B.Sc., M.D., F.R.C.P. Edin., Physician, Royal Infirmary, Edinburgh, etc. 391 pages. Price 5/- net. A. & C. Black, Ltd., London, 1931.

Medical men are apt to look somewhat askance at books designed to give medical advice to the laity. The reasons for this are obvious. Either too much or little information is given, and household prescribing is apt to be substituted for reference to a doctor, which may, at times, be disastrous. Nowadays, however, the general public is receiving so much information, of a kind, about diseases and their prevention that an authoritative work, like the above, may easily justify its *raison d'être*.

Doctor Comrie, whose professional eminence is well known, has here produced a book which is freer from objections on the above scores than any we know. It is more than a book confined to the tabulation of physical signs and the prescription of treatment. It deals with many subjects related to medicine, if not strictly ailments, such as, auto-suggestion, care of babies, defects of speech, infant feeding, antiseptics, disinfection, drowning, food stuffs, sanitation, vitamins, and so on. As these varied topics are arranged alphabetically, the book is actually a sort of encyclopædia, and the reference to them is rendered easy. The book begins with a number of first-aid hints, which are briefly given, but with references to the appropriate sections, so that the required assistance may be intelligible. It would have been well to have included a short preliminary chapter giving more precise instructions as to when a doctor should be called in. Sometimes this matter is referred to under the special sections, but not always. Appendicitis, for example, is such a tricky affection that it would have been well to insert a note of warning against delay in calling in expert advice. We note a few errors which have escaped observation. On page 296 "pubis" should be "pubes"; on page 311 "sanitorium" should

be "sanitarium". We regret to see, also, that "tubercular" is commonly used when "tuberculous" is the proper adjective. A few subjects included are above the heads of the book's clientèle. Such a one is "reticulocytes". We question the propriety of giving the dosage of dangerous drugs. Some drugs are so seldom used now that it is unnecessary to include them, for example, "musk". By judicious pruning the size of the work might be reduced without lessening its value for its special purpose. Apart from these mild criticisms, which are intended to be constructive, Doctor Comrie's book has a distinct place and can be recommended as the best of its kind.

Mental Nursing (Simplified). O. P. Napier Pearn, M.R.C.S., L.R.C.P., D.P.M., Deputy Medical Superintendent, Cane Hill Mental Hospital. 304 pages. Baillière, Tindall & Cox, London, 1931.

This small volume is intended to assist the student mental nurse in her study of the "*Handbook for Mental Nurses*" published for the Medico-Psychological Association. The same general plan is followed in this shorter volume and much space is saved by condensing the material into short isolated sentences. Much information of value to the nurse is presented, but, with our increased standards of preliminary education for nurses, one doubts the necessity of treating portions of the text in such an elementary fashion. Of most value to the nurse, especially to the general-duty nurse desiring to increase her knowledge of mental nursing, are the chapters on the Mind in Health, Mental Disease and Disorder, and Some Special Nursing Points.

Elementary Bacteriology and Parasitology for the Use of Nurses. Herbert Fox, M.D., Director of the William Pepper Laboratory of Clinical Medicine in University of Pennsylvania, etc. Fifth edition. 311 pages, illustrated. Price \$2.50. Lea & Febiger, Philadelphia, 1931.

The fifth edition of this well known nurses' text-book is an excellent volume of some 311 pages. This edition has been extensively re-edited to keep pace with the higher standards of nursing education and with the increasing use of the pathological laboratory for the practical instruction of undergraduate nurses. In this edition the text has been revised to give in greater detail certain laboratory procedures. Emphasis has been placed upon certain clinical procedures, such as skin tests, bed-side collection of specimens, blood typing and the practical application of disinfection. There is an excellent chapter on parasitology. An effort is made to avoid unduly difficult terms and a glossary is appended. The book is well edited, profusely illustrated, many plates being in colours, and can be recommended to the nursing profession; in fact, it would be a valuable addition to the library of any medical student or practitioner.

Yellow Fever—An Epidemiological and Histological Study of its Place of Origin. Henry Rose Carter, Late Assistant Surgeon-General, United States Public Health Service. 308 pages, illustrated. Price \$5.00. Williams & Wilkins, Baltimore, 1931.

It is unnecessary to refer to the qualifications of the author of this book other than to quote Major Walter Reed, who said: "His work did more to impress me with the importance of an intermediate host in yellow fever than everything else put together." On account of the death of Doctor Carter before the final revision of this book, it was prepared for the press by Laura Armistead Carter and Wade Hampton Frost. The editors, in completing the book, used their own judgment in any necessary revisions and rearrangement.

The first chapter is taken up with a discussion of the causative organism, the mosquito, the distribution of yellow fever. Some of the material is naturally not quite up-to-date, as since the death of the author, in 1925, recent research has added much to our know-

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ledge of the mode of transmission and the virus of the disease. The second chapter deals with the diseases usually confused with yellow fever, ten in number, the most important of these being malaria and typhus. The third and much the longest chapter is concerned with the place of origin of yellow fever. Doctor Carter states there are only two places in the world in which climatic and sociological conditions make endemic yellow fever possible, namely tropical America and West Africa. He gives the reasons for deciding the disease did not exist in America before the coming of Columbus in 1492, and finally concludes that the seat of origin must have been in West Africa. While some of the evidence adduced is of a negative value, yet, the biological and histological evidence strongly point to an African origin of yellow fever.

In perusing the book, the reviewer is greatly impressed with the vast amount of laborious and painstaking research and reading that went into the making of it. From the bibliography, it is noted that no fewer than 237 were studied, quite a number of them in the Spanish and French languages. The author devoted long years to the study of yellow fever, a disease of absorbing interest to him, and of which he hoped to write a complete history. A lingering illness, however, prevented him from realizing a life's ambition, and his effort was largely limited to a consideration of the early history of this important disease.

The book will be of considerable interest to those concerned with tropical diseases.

Thomson and Miles' Manual of Surgery. Alexander Miles, M.D., LL.D., F.R.C.S. and D. P. D. Wilkie, M.D., F.R.C.S. Three volumes; eighth edition. Price \$4.00 a volume. XXXVIII and 1,837 pages, 656 illustrations, in all. Oxford University Press, London; McAinsh & Co., Toronto, 1931. (The volumes may be purchased separately).

When a medical or surgical work has been in existence twenty-seven years and has reached eight editions in that time there is little need to praise it. It has worked out its own salvation. Clearly, it must have met and must continue to meet a distinct want. Originally written by Thomson and Miles, the title page of the work now bears the name of Prof. D. P. D. Wilkie who succeeded Prof. Alexis Thomson in the Chair of Surgery at Edinburgh University. Associated with the authors are twenty-one coadjutors, all surgeons of Edinburgh, who have revised various sections dealing with topics in which they are specially interested.

The first volume deals with general surgery, including general surgical pathology; the second with the head, neck and extremities; and the third with the thorax and abdomen. Many of the chapters are preceded with a short section dealing with the anatomy and physiology of special regions, which will be found of much value. Surgical pathology is not overlooked. A special feature of the work is the profusion of the illustrations, which are always informative, and tell the story, so far as clinical and pathological appearances are concerned, at least, almost as well as the

text. It would be too much to expect that the whole of surgery could be compressed into three volumes of such modest and convenient size, but a comprehensive view of each subject is given, with the opinions of the writers. Thomson and Miles is in no sense a work on operative surgery. It is, rather, a book for students, and is admirably adapted for their needs, though the experienced operator also can profit from much of the information provided. The authors have endeavoured to present the present position of surgery, and, particularly, the viewpoint of the Edinburgh School. Few books are so well adapted for their purpose. Thomson and Miles bids fair to be a classic.

Matas Birthday Volume. A Collection of Surgical Essays, Written in Honor of Rudolph Matas, New Orleans. 396 pages, illustrated. Price \$10.00. Paul B. Hoeber, New York, 1931.

The occasion for this volume is the fiftieth anniversary in professional life and the attainment of the biblical three score years and ten in the career of Dr. Rudolph Matas, the great New Orleans surgeon. To the jubilarian the book is affectionately dedicated by the authors, who, whether as former pupils or other close friends and admirers, have seized upon the auspicious circumstance to do honour to one of the world's greatest surgeons and one of surgery's finest exponents of character, high ideals and wide culture. The book, however, is more than this. It holds the mirror up to Professor Matas' active surgical life and the result is a most interesting and instructive contribution to our surgical literature.

A portion of the text deals with surgical conditions of the vascular system. Naturally Dr. Matas' own pioneer work on aneurysms and allied vascular lesions is woven into the discussions. Case reports are copiously quoted. An article, "Raynaud's Disease and Thromboangiitic Gangrene," by Dr. Roberts Alessandri, of Rome, is particularly outstanding. Besides Dr. Alessandri, the contributors to the volume are Drs. Mont R. Reid, René Leriche, Hubert A. Royster, Joseph Colt Bloodgood, J. M. Finney, Robert C. Coffey, E. Ribas, Y. Ribas, Fred. L. Hoffman, J. Shelton Horsley, John B. Deaver, George W. Crile, Paul Moure, Joaquin Trias-Pujol, William J. Mayo, D. P. D. Wilkie, Howard Lilienthal, and E. A. Graham. Each of these gentlemen has a chapter to himself. Splendid expositions of surgical subjects, personal reminiscences, historical references, are all treated skilfully and pleasingly, and without the usual conventions of the chair. The result is an interesting, instructive and entertaining volume which even those of us who do not know Professor Matas will delight to read.

BOOK RECEIVED

Medical Clinics of North America. Vol. 15, no. 3, Chicago number. Issued serially every other month. 300 pages, illustrated. Price \$18.00 (6 numbers). London and Philadelphia, W. B. Saunders; Toronto: McAinsh & Co., 1931.

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